SECTION 18

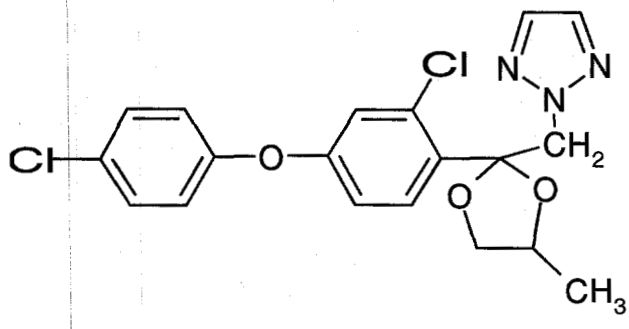
Emergency Exemption for use of Inspire Super MP on

Cucurbits in Georgia
Almonds in California (4 Counties)

Environmental Fate and Ecological Risk Assessment

For

Difenoconazole
(PC 128847)
1-{2-[4-(chlorophenoxy)-2-chlorophenyl-(4-methyl -1,3-dioxolan-2-yl)-methyl]}
-1H-1,2,4-triazole



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1.0 Nature of Chemical Stressor

Difenoconazole is a broad spectrum, preventive fungicide with systemic and curative properties recommended for the control of many important plant diseases. The mode of action is demethylation inhibititor of sterol biosynthesis which disrupts membrane synthesis by blocking demethylation. It was first registered in Aug 4, 1994. The existing difenoconazole uses include wheat, triticale, canola seed treatment, fruiting vegetables, pome fruit, vegetables subgroup (tuberous and corm), sugar beets, and ornamentals. A Section 3 Environmental Risk Assessment was written for new uses of difenoconazole in July 2007.

2.0 Use Characterization

The proposed Section 18 Emergency Exemption is for use of Inspire Super™ MP on cucurbits (watermelons, cantaloupes and cucumbers) in Georgia during the 2008 use season for control of gummy stem blight (Figure 1). The use season begins March 15 and ends October 15, 2008. The total acreage is 68,000 of cantaloupes, watermelons and cucumbers in Georgia. The method of application is ground and aerial spray, with most application applied by convential ground sprayers. The Inspire Super™ MP multipack, consisting of Inspire Super™ MP fungicide and Vangard® WG fungicide, from Syngenta Crop Protection contains the active ingredients difenoconazole and cyprodinil. The maximum proposed single application rate is 0.114 lb a.i./A with 4 applications for a annual maximum rate of 0.46 lb a.i./A.

In addition, there is a proposed Section 18 use on almonds in California limited to Butte, Glenn, Kern and Tehama Counties for control of alternia leaf spot (Figure 2). The use season being April 15 and ends June 30, 2008. The method of application is ground-air-blast. The request is for use of Inspire (0.11 lb a.i./A) with two applications per year and alternated with Endorse® (0.11 lb a.i./A, active ingredient is polyoxin D). The two products are to be applied separately and not tank mixed.

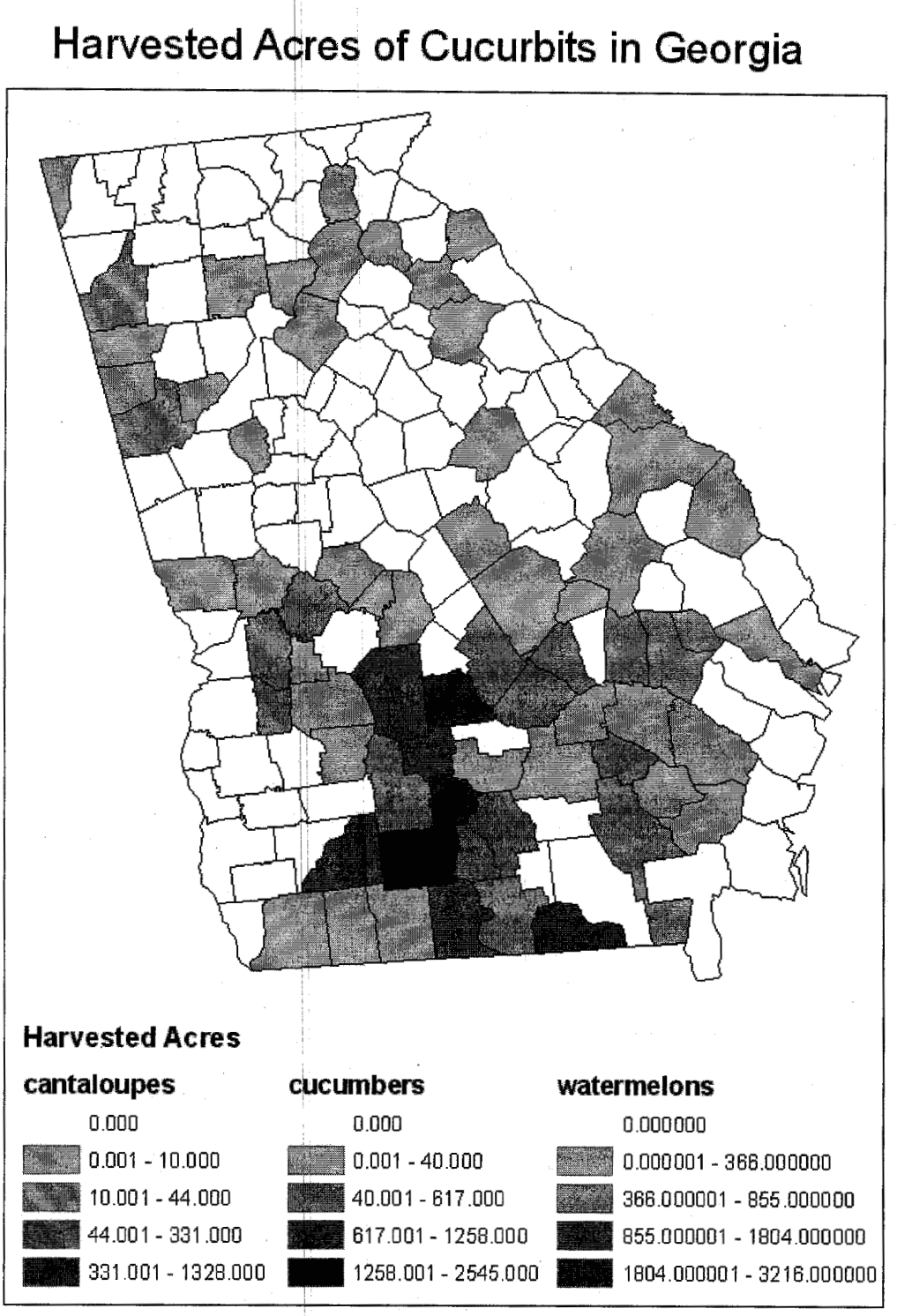


Figure 1. Harvested acres of cantaloupes, cucumbers and watermelons in Georgia according to USDA NASS 2002

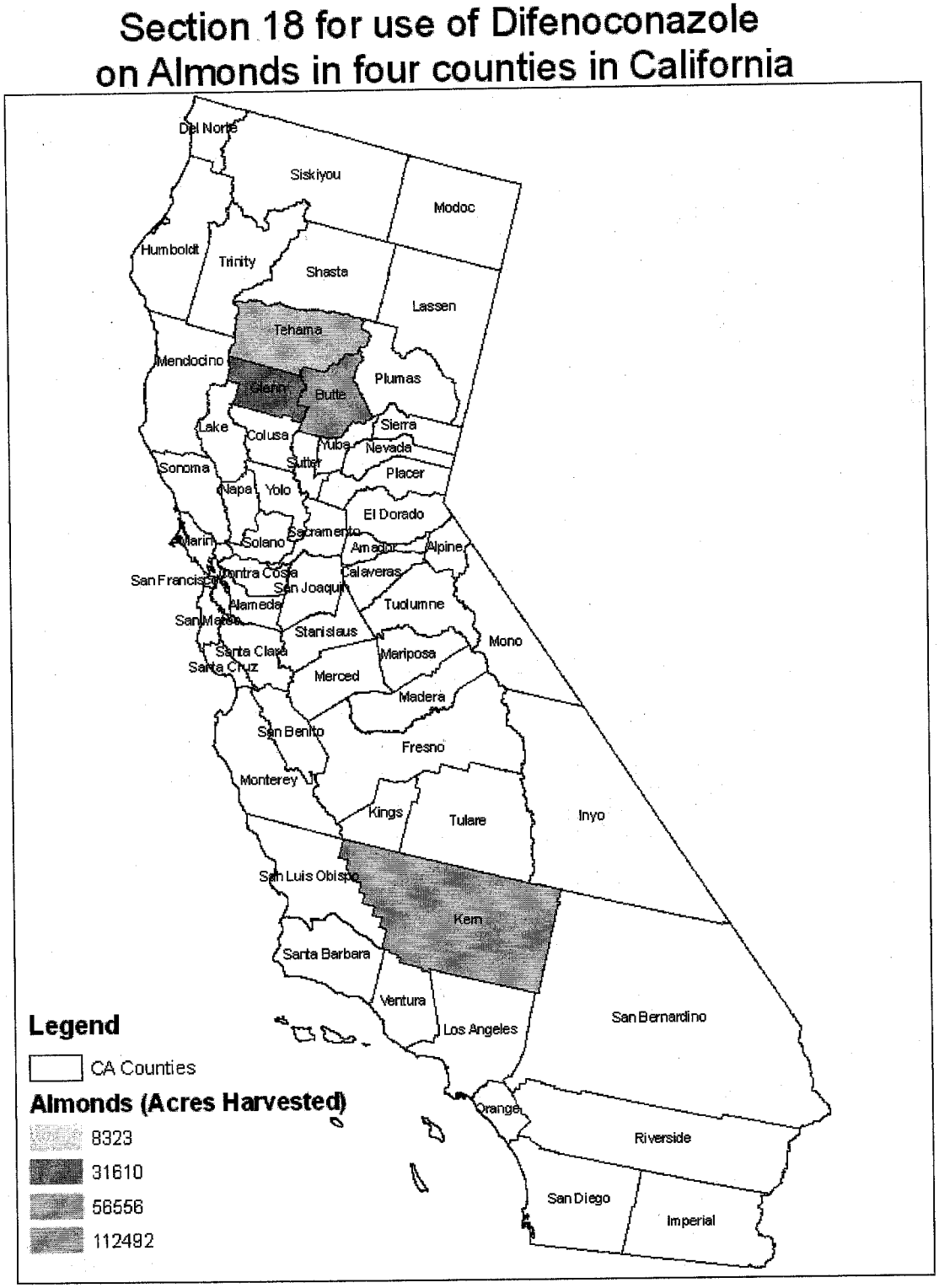


Figure 2. Harvested acres of almond in four counties in California according to USDA NASS 2002

3.0 Exposure Characterization

3.1 Environmental Fate and Transport Characterization

In soil environment, difenoconazole is persistent and slightly mobile. Difenoconazole has low potential to reach ground water, except in soils of high sand and low organic matter content. During a runoff event, difenoconazole will potentially runoff into adjacent bodies of surface water. In aquatic environment, difenoconazole main route of dissipation is partitioning into the bottom sediment as shown in an aerobic aquatic metabolism study (MRID 42245134), in which the distribution ratio of sediment and water phases was 8:1 at 1 day post treatment and 40:1 at 30 days post treatment. Difenoconazole undergoes potentially relatively fast to slow aqueous photolysis in clear water conditions.

Difenoconazole was stable to hydrolysis at pH 5, 7, and 9 in aqueous buffered solutions maintained at 25 °C over the course of a 30 day incubation period (MRID 42245128). Based on the registrant-submitted laboratory studies, difenoconazole may potentially undergo relatively fast photolysis in natural aquatic environment. The photolytic degradation may be attributable to absorption by organic components present in the natural water. Aqueous photolysis of difenoconazole in sterile buffer solutions proceeded with the half-lives of 6 and 228 days (MRIDs: 42245128 and 46950105). The half-life of 228 days was extrapolated from a 15-day study in which difenoconazole slowly photolyzed from 100% to 91% under artificial light conditions (supplemental study; MRID 46950105). Difenoconazole was stable to soil photolysis.

Difenoconazole is relatively stable to aerobic soil metabolism, stable to anaerobic soil metabolism, and aerobic and anaerobic aquatic metabolism. When applied at 0.1-0.23 ppm to an aerobic soil, difenoconazole appear to degrade with half-lives ranging from 84.5 to 533 days based on laboratory studies conducted on variety of soils, European and domestic origin. At concentrations of 10 ppm, difenoconazole degraded with the half-lives of 1059-1600 days in aerobic, and 947 days anaerobic loam soil, respectively. The longer half-life values obtained for those higher concentration rates may imply that the rate of difenoconazole microbialy mediated degradation may be concentration dependent.

In aquatic environment under aerobic conditions, difenoconazole microbially degraded with half-lives ranging from 315 to 565 days at concentrations up to 0.17 mg ai/L, and 860 days in concentration of 10 mg ai/L. Under anaerobic conditions, difenoconazole degraded with 370 days at concentration of 0.04 mg ai/L, and 1245 days at concentrations of 10 mg ai/L.

During aqueous photolysis, difenoconazole breaks down to triazolyl acetic acid (CGA-142856) and is further degraded to triazole methanol (CGA-107069) and triazole (CGA-71019). Minimal carbon dioxide is also produced (MRID 46950104). In aerobic soil (MRID 46950109-12), difenoconazole degrades slowly to CGA 205374, which in turn degrades to CGA 205375, CGA 189138 and other minor compounds, and these are mineralized to CO_2 (formed up to 23%,

MRID 46950111) and converted to bound residues (up to 48.9% of the applied at 293 days, MRID 46950110).

According to the Food and Agriculture Organization of the United Nations classification system (UN FAO, 2000), difenoconazole appears to be slightly mobile in soils. Freundlich K_{ads} values were 12.8 for sand soil, 63.0 for sandy loam soil, 54.8 for silt loam soil, and 47.2 for silty clay loam soil. The corresponding Koc values were 3867, 3518, 3471, and 7734 mL/g. (MRID 42245135). In another study, registrant-calculated Freundlich adsorption K values were 11.6, 22.9, 182, and 201 for the Madera loamy sand, Visalia sandy loam, North Dakota clay loam, and Florida sand soils, respectively; corresponding Freundlich Koc values were 3870, 4587, 4799, and 11202.

Difenoconazole major degradate, CGA205375 (1-[2-Chloro-4-(4-chlorophenoxy)-phenyl]-2-[1,2,4]triazol-1-yl-ethanol), has potential to be slightly more mobile in the soil than its parent fungicide. Freundlich adsorption K values for CGA205375 are 9.6, 12.3, 145, and 116 for the Madera loamy sand, Visalia sandy loam, North Dakota clay loam, and Florida sand soils, respectively; corresponding Freundlich Koc values are 3214, 2470, 3824, and 6432 (MRID 46950123). According to the UN FAO classification, CGA205375 appears to be slightly mobile. In addition, the K_{ads} values are directly proportional to soil organic carbon content.

Submitted terrestrial field dissipation studies showed that difenoconazole and its degradates did not leach below 30 cm of soil depth except in one study that it leached up to 60 cm of the cropped plot soil (under potato production conditions in ND; MRID 46950129). Difenoconazole degraded with half-lives ranging from 136 to 462 days in the terrestrial field dissipation studies.

Based on difenoconazole low vapor pressure of 2.5×10^{-10} mm Hg and solubility in water of 15 mg/L, difenoconazole has a low propensity to volatilize and generate vapors after application. At the study termination in the laboratory studies, the residues detected in the organic volatiles trap totaled 0.7% or less, most instances less than 0.1%, of the applied difenoconazole. The concentrations of the applied defenoconazole lost through volatilization were not measured in the terrestrial field dissipation studies.

Difenoconazole accumulated rapidly in edible and non-edible bluegill sunfish tissues with bioconcentration factors of 170x for edible tissues, 570x for nonedible tissues, and 330x for whole body. Depuration was also rapid with a depuration half-life of approximately 1 day and 96-98% clearance after 14 days of depuration. From both edible and non-edible tissues, one metabolite was recovered, CGA-205375, and accounted for 51-64% of the applied.

Table 1 summarizes the environmental fate data of the parent difenoconazole. A summary table of difenoconazole major degradates and the maximum percent formation observed in the laboratory and field studies is presented in **Table B-1 and Table B-2, Appendix B** of this document. For the summaries of difenconazole fate and transport studies refer to the Section 3 New Uses EFED Science Chapter completed July, 2007 (D333319 and D340041).

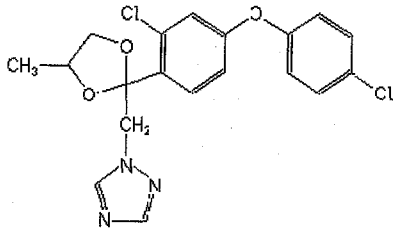
Table 1. Summary of the physical and chemical properties of difenoconazole.		
Property	**Value**	**Source**
Name	Difenoconazole	
SMILES notation	O1CC(C)OC1(Cn2ncnc2)c3c(Cl)cc(Oc4ccc(Cl)cc4)cc3	EPI Suite, v3.12 SMILES
Structure		
CAS number	119446-68-3	
Molecular weight	406.27	MRID 46950104
Molecular formula	$C_{19}H_{17}Cl_2N_3O_3$	
Water solubility	15 mg/L (25 °C)	MRID 46515901
log K_{ow}	4.4 (25 °C)	MRID 46950105
Vapor pressure	2.5 x 10^{-10} mm Hg (25 °C)	MRID 46515901
Henry's Law constant	8.9 x 10^{-12} atm x m^3/mol	MRID 46515901
Soil adsorption coefficient K_{oc} (L/kg)	3867, 3518, 3471, and 7734 3870, 4587, 4799, and 11202	MRID 42245135 [A] MRID 46950121
Hydrolysis half-life pH = 5 pH = 7 pH = 9	 Stable Stable Stable	MRID 42245127
Photolysis half-life in water	6 days – ca. 1 ppm in sterile buffer solution (30-day study) ca. 9.2 days – 1mg ai/L in natural water 228 days – 1.52 ml ai/L in sterile buffer solution (15-day study)	MRID 42245128 MRID 46950104 MRID 46950105 [B]
Photolysis half-life in soil	349 - 823 days	MRID 46950106 [C]

Table 1. Summary of the physical and chemical properties of difenoconazole.		
Property	**Value**	**Source**
Aerobic soil metabolism half-life	84.5 days – at 0.1 ppm concentration 1600 days – at 10 ppm in loam 1059 days – at 10 ppm in sandy loam 120 days – at 0.13 ppm; Swiss loam 104 days – at 0.13 ppm; Swiss loam 165 (158) days – at 0.23 ppm; Swiss sandy loam 204 (187) days – at 0.23 ppm; Swiss sandy loam/loamy sand 204 (198) days – at 0.23 ppm; French silty clay loam 433 (408) days – at ca. 0.1 ppm in CA loamy sand at 25 °C 533 days – at ca. 0.1 ppm in CA loamy sand at 25 °C	MRID 42245131 MRID 42245132[D] MRID 42245133[D] MRID 46950109 MRID 46950110 MRID 46950111 MRID 46950112 MRID 46950114
Anaerobic soil metabolism half-life	947 days – at 10 ppm in loam	MRID 42245132
Aerobic aquatic metabolism half-life	860 days (10mg a.i./L) 315 (330) days (nominal 0.1 kg a.i./ha (=0.17 mg a.i./L); Swiss pond water-silty clay loam sediment) 335 (301) days (0.17 mg a.i./L; Swiss river water-sandy loam sediment) 565 days (0.04 mg a.i./L)	MRID 42245134[E] MRID 46950116 MRID 46950117
Anaerobic aquatic metabolism half-life	1245 days (10mg a.i./L) 370 days (433) (0.04 mg a.i./L)	MRID 42245134[E] MRID 46950119
Terrestrial field dissipation half-life	252 days - determined in the 0- to 3-inch depth – CA bare loamy sand 231 days – GA bare loamy sand (four applications of 0.13 lb ai/A) 139 days – CA bare plot of loam soil (four applications of 0.13 lb ai/A) 462 days – ND bare sandy clay loam	MRID 42245140 MRID 46950126 MRID 46950127 MRID 46950129
Laboratory accumulation in fish bioaccumulation factor (*Lepomis macrochirus*) a depuration half-life	170x in edible tissues 570x nonedible tissues 330x for whole body 1 day	MRID 42245142

[A] There was another adsorption/desorption study (MRID 42245136) reviewed in which the test soils were autoclaved prior to conducting the study which could distort the mobility characteristic of difenoconazole, thus, the study results were not used for calculation of modeling input parameters.

[B] For the modeling purposes the longest half-life was used as it represents the most conservative scenario.

[C] The soil photolysis half-life under xenon light condition was recalculated to represent the conditions under natural sunlight intensity during 30-day periods between June and September (104.7-246.9 W·min/cm^2), as a result, a range of half-lives was obtained.

[D] In those aerobic soil metabolism studies (MRID 42245132 and MRID 42245133) the test application rate was significantly higher than expected under registrant-proposed use condition for difenoconazole.

[E] In those aquatic metabolism studies, the test application rates were significantly higher than expected under registrant-proposed use condition for difenoconazole.

3.2 Surface and Ground Water Assessment

The proposed application rate of difenconazole for emergency exemption use on cucurbits (watermelons, cantaloupes and cucumbers) in Georgia and almonds in California is same or lower than the application rates for already registered uses. Difenconazole was first registered in Aug 4, 1994; the existing difenoconazole uses include wheat, triticale, and canola seed treatment. The recently registered uses include pome fruits, sugar beets, fruiting vegetables, vegetables, tuberous and corm, subgroup, and ornamentals (Sec 3, July 2007; D333319).

Among all the registered uses, the highest estimated drinking water concentrations (EDWCs) from surface water sources were derived for aerial applications of difenoconazole to California ornamental nurseries at the maximum annual application rate of 0.60 kg ai/ha. The second highest EDWC were derived for Maine potatoes at the maximum annual application rate of 0.48 kg ai/ha. These concentrations are recommended to be used for the human health risk assessment purpose. The highest predicted drinking water concentrations of difenoconazole from surface water sources, from agricultural and non-agricultural uses, are presented in **Table 2.**

Table 2. Tier II PCA Corrected Difenoconazole EDWCs from Surface Water Sources

Scenario	Application Type/Annual Fungicide Application Rate (kg ai/ha))	Estimated Drinking Water Concentrations (µg/L)		
		1 in 10 year annual peak	1 in 10 year annual mean	36 year annual mean
CA Ornamental Nursery	aerially applied 0.15 x 4 = 0.60	13.3	9.43	7.18
ME Potato [a]	aerially applied 0.12 x 4 = 0.48	12.5	8.14	6.63

[a] EXAMS EECs multiplied by 0.87, a default PCA factor. No PCA was applied to the EDWCs from the Ornamental scenario.

For same difenconazole registered uses on nurseries and potato, the SCI-GROW model estimated the concentration of difenoconazole in drinking water from shallow ground water sources to be 1.08×10^{-2} µg/L for agricultural uses (nurseries), and 1.28×10^{-2} µg/L for non-agricultural uses (potato). These concentrations can be considered as both the acute and chronic values.

For detail information regarding drinking water assessment refer to document untitled, Amended Difenoconazole (Parent Only) Drinking Water Assessment in Support of New Use Registration Action for Fruiting Vegetables, Tuberous, Corn, Vegetables Subgroup, Pome Fruit, Ornamentals, and Sugar beets, from June 19, 2007 (D333319 and D340041).

In clear natural water, difenoconazole may break down by photolysis to triazolyl acetic acid and further to triazole methanol and triazole. 1,2,4-Triazole and its conjugates (triazole alanine and triazole acetic acid) are common metabolites to the class of compounds known as the triazole-derivative fungicides (T-D fungicides, conazoles). A separate cumulative risk assessment was conducted on 1,2,4-trizole degradates. The Office of Pesticide Program's Health Effects

Division (HED) has conducted aggregate human health risk assessments for 1,2,4-triazole and triazole conjugates which was completed on Feb 7, 2006 (D320683). A Tier II drinking water assessment for 1,2,4-triazole was completed in Feb 28, 2006 (D320682).

3.3 Aquatic Resource Exposure Assessment

No ground or surface water monitoring data are available for difenoconazole. Therefore, exposure concentrations of difenoconazole for aquatic ecosystems assessments were estimated based on the EFED aquatic Tier II model PRZM/EXAMS. A graphical user interface (pe5.pl), developed by the EPA (http://www.epa.gov/oppefed1/models/water), was used to facilitate inputting chemical and use specific parameters into the appropriate PRZM input files (inp) and EXAMS chemical files. This approach employs PRZM, which simulates runoff and erosion from an agricultural field on a daily time step. The runoff and erosion flux output data from PRZM, combined with spray drift, are used as chemical loadings to EXAMS, which simulates surface water in order to predict the EECs. EECs for ecological risk assessment were determined using PRZM 3.12/EXAMS 2.98.04 with Pond modeling scenario, which describes a generic scenario for the EXAMS component of the modeling exercise.

The aquatic exposure assessment was based on the CA almond modeling scenario for the proposed use of difenconazole on California almonds. The FL cucumbers and GA onion scenarios were used for proposed use on cucumbers, cantaloupes and watermelon in Georgia. FL cucumber and GA onion scenarios were used as surrogate scenarios in place of unavailable GA cucurbits scenario. In the Coastal Plain of Georgia, cucurbits are grown on a wide variety of well drained soil types from loamy sand to sandy loam soils. Similarly, Georgia onions grow best on fertile, well-drained soils, and these are mostly sandy loam, loamy sand or sandy soils. Therefore, the GA onion scenario written for Clarendon loamy sand with growing season from September (crop emergence) to June (crop maturation and harvest) is well suited surrogate for unavailable Georgia cucurbit scenario. In addition, FL cucumber scenario was used to assure conservativeness of the modeling for the proposed uses on cucurbits. Florida cucumber scenario is written for Riviera sand, but the growing season in Florida, being from October to December, and meteorological information is different than in Georgia. **Table 3** lists the input parameters used for the aquatic exposure modeling.

PRZM/EXAMS surface water EEC values for each of the modeled crop scenarios are summarized in **Table 4**. The selected modeling output files are provided in **Appendix C** of this document.

Table 3. PRZM/EXAMS Chemical Specific Input Parameters for Difenoconazole		
Parameter	**Input Value and Unit**	**Source**
Maximum application rate	0.128 kg ai/ha	Product Label Inspire®
Maximum number of applications	4 cucurbits 2 almonds	Product Label Inspire®
Method of application (CAM = 2)	Aerial and ground spray	Product Label Inspire®
Minimum interval between applications	7	Product Label Inspire®
Application efficiency	0.95 (aerial spray) 0.99 (ground spray)	EFED Model Input Guidance, Version II (2002)
Spray drift	0.05 (aerial), and 0.01 (ground)	EFED Model Input Guidance, Version II (2002)[a]
Partition coefficient K_{oc}[b]	5381 mL/g	MRIDs: 42245135 and 46950121
Application date	5-27	Application timing was selected based on the registrant data and based on the USDA Crop Profile website
Henry's Law constant	8.9×10^{-12} atm x m^3/mol	MRID 46515901
Hydrolysis	Stable	MRID 42245127
Aerobic soil metabolism ($t_{1/2}$)[c]	313 days	MRIDs.: 42245131, 46950109-12, and 46950114
Aerobic aquatic metabolism ($t_{1/2}$)[d]	556 days	MRIDs.: 46950116 & 46950117
Anaerobic aquatic metabolism ($t_{1/2}$)[e]	1110 days	MRID 46950119
Aquatic photolysis $t_{1/2}$ (days)[f]	228 days	MRID 46950105
Vapor pressure	2.5×10^{-10} mm Hg (25 °C)	MRID 46515901
Solubility in water[g]	150 mg/L (25 °C)	MRID 46515901
Molecular Weight	406	MRID 46950104
Foliar dissipation	Default value	

[a] *Guidance for Selecting Input Parameters in Modeling the Environmental Fate and Transport of Pesticides, Version II"* dated February 28, 2002.
[b] There was a positive correlation between the K_F values vs. organic matter content; therefore, the average K_{oc} was used as an parameter.
[c] The 90% of the UCL of the mean metabolism half-life.
[d] The 90% of the UCL of the mean metabolism half-life of all available half-lives but those obtained for high test rate.
[e] At proposed application rate only one half-life was available, the half-life was multiplied by three (i.e., 3 x 370 days).
[f] The maximum value available.
[g] Solubility 15 mg/L x 10.

Table 4. Difenoconazole EECs (µg a.i./L) obtained from PRZM/EXAMS				
Scenario	**# Appl**	**Peak**	**21-Day Value**	**60-Day Value**
Applications to Almonds				
CA Almond Aerial	2	1.53	1.32	1.21
CA Almond Ground	2	0.92	0.77	0.74
Applications to Cucumber, Watermelons, Cantaloupes				
FL Cucumber Aerial	4	7.22	6.03	5.53
FL Cucumber Ground	4	6.93	5.71	5.12
GA Onion Aerial	4	6.73	5.80	5.36
GA Onion Ground	4	6.26	5.26	4.86

3.4 Terrestrial Organism Exposure Modeling

Terrestrial wildlife exposure estimates are typically calculated for birds and mammals emphasizing a dietary exposure route for uptake of pesticide residues on vegetative matter and insects. These exposures are considered as surrogates for terrestrial-phase amphibians as well as reptiles. For exposure to terrestrial organisms, pesticide residues on food items are estimated, based on the assumption that organisms are exposed to a single pesticide residue in a given exposure scenario. The residue estimates from spray applications are based on a nomogram by Hoerger and Kenaga (1972) as modified by Fletcher et al. (1994) that correlated residue levels, based on application rate, on various terrestrial items immediately following application in the field. The *maximum* residue concentration for each food group was derived from literature and tolerance data. Specifically, for every 1 lb ai/acre of application, the resulting maximum concentration on short grass is 240 ppm, on tall grass is 110 ppm, on broad-leaved plants/small insects is 135 ppm, and on seeds/large insects is 15 ppm. For every 1 lb ai/acre of application, the resulting mean concentration on short grass is 85 ppm, on tall grass is 36 ppm, on broad-leaved plants/small insects is 45 ppm, and on seeds/large insects is 7 ppm.

Determination of residue dissipation over time on food items following single and multiple applications are predicted using a first-order residue degradation half-life with EFED's "T-REX_v1.2.3" model. A default value of 35 days was used for a foliar dissipation parameter because difenoconazole magnitude of the residues studies did not provide reliable, statistically robust data suitable to estimate a valid foliar dissipation half-life.

The screening-level risk assessment for difenoconazole uses maximum predicted residues as the measure of exposure to estimate risk. The predicted maximum residues of difenoconazole that may be expected to occur on selected avian or mammalian food items immediately following application (at the maximum annual or seasonal label rate) is presented in **Table 5**.

The residues or estimated environmental concentrations (EECs) on food items may be compared directly with subacute dietary toxicity data or converted to an ingested whole body dose (single oral dose), as is the case for small mammals and birds. A single oral dose represents a very short-term high intensity exposure, where as dietary exposure may be of a more prolonged nature. The EEC is converted to oral dose by multiplying the EEC by the percentage of body weight consumed as estimated through allometric relationships. These consumption-weighted EECs (i.e. EEC equivalent dose) are determined for each food source and body size for mammals (15, 35, and 1000 g) and birds (20, 100, and 1000 g). The EEC equivalent doses for birds and mammals are given in **Tables 6 and 7**, respectively.

Table 5. Peak Terrestrial EECs Estimated Using Kenaga Values for Difenoconazole Applied to cucurbits		
	Maximum Residue (ppm)	Mean Residue (ppm)
Short grass	89.77	31.79
Tall grass	41.14	13.47
Broadleaf plants and small insects	50.49	16.83
Fruits/pods/large insects	5.61	2.62

Table 6. Avian EEC equivalent dose adjusted for body weight based on maximum residues for difenoconazole application on cucurbits and almonds four times per year (7-day interval).			
EEC equivalent dose (mg/kg-body weight)	Avian Classes and Body Weights		
	small	mid	large
	20 g	100 g	1000 g
Percent Body Weight Consumed	114%	65%	29%
Short Grass	102.24	58.30	26.10
Tall Grass	46.86	26.72	11.96
Broadleaf plants/small insects	57.51	32.79	14.68
Fruits/pods/large insects	6.39	3.64	1.63

Table 7. Mammalian EEC equivalent dose adjusted for body weight based on maximum residues for difenoconazole application on cucurbits and almonds four times per year (7-day interval).						
EEC equivalent dose (mg/kg-body weight)	Mammalian Classes and Body weight					
	Herbivores/ Insectivores			Granivores		
	15 g	35 g	1000 g	15 g	35 g	1000 g
Percent Body Weight Consumed	95%	66%	15%	21%	15%	3%
Short Grass	85.59	59.15	13.71			
Tall Grass	39.23	27.11	6.29			
Broadleaf plants/sm Insects	48.14	33.27	7.71			
Fruits/pods/seeds/lg insects	5.35	3.70	0.86	1.19	0.82	0.19

The TerrPlant Model was created by the Environmental Fate and Effects Division (EFED) as a Tier 1 model to provide screening level estimates of exposure to terrestrial plants from single pesticide applications. TerrPlant derives pesticide EECs in runoff and in drift. For difenoconazole, EECs were not calculated for terrestrial plants because the toxicity test was qualitative. The test included observations of visible effects on seedling emergence and vegetative vigor. No phytotoxic effects were observed in any species at the five treatments tested following pre- or post-emergence application (NOAEC > 0.44 lb a.i./A). At the proposed application rates, adverse affects to non-target terrestrial plants are not expected based on the observation based phytotoxicity testing completed; however, definitive RQs cannot be calculated.

4.0 Ecological Effects Characterization

4.1 Evaluation of Aquatic and Terrestrial Ecotoxicity Studies

In screening-level ecological risk assessments, effects characterization describes the types of effects a pesticide can produce in an organism or plant. This characterization is based on registrant-submitted studies that describe acute and chronic toxicity effects information for various aquatic and terrestrial animals. **Appendix D** summarizes the results of the registrant-submitted toxicity studies used to characterize effects for this risk assessment. Toxicity testing reported in this section does not represent all species of birds, mammals, or aquatic organisms. Only a few surrogate species for both freshwater fish and birds were used to represent all freshwater fish (2000+) and bird (680+) species in the United States. For mammals, submitted acute studies were limited to the rat. A chronic estuarine/marine fish toxicity study was not submitted by registrant. Also, OPP guidelines for toxicity testing do not require that reptiles and amphibians be tested. In the absence of toxicity information on reptiles, the risk assessment assumes that avian and reptilian toxicities are similar. In the absence of toxicity information on reptiles, it is assumed that fish and amphibians have similar toxicities.

For acute toxicity, difenoconazole is classified as slightly toxic to birds, non toxic to honeybees and is slightly toxic to mammals. Difenoconazole is moderately to highly toxic to freshwater fish and highly toxic to freshwater invertebrates, estuarine/marine fish and estuarine/marine invertebrates. Five aquatic plant toxicity studies were submitted which demonstrated difenoconazole toxicity to aquatic plants. A visible phytotoxicity (including emergence and mortality) test was carried out on seedling emergence and vegetative vigor of terrestrial plant species.

Tables 8 and 9 summarize the most sensitive ecological toxicity endpoints for aquatic and terrestrial organisms respectively.

Table 8. Summary of Acute and Chronic Aquatic Toxicity Data Using Difenoconazole					
Species	**Acute Toxicity**			**Chronic Toxicity**	
	96-hr LC_{50} (µg ai/L)	**48-hr EC_{50} (µg ai/L)**	**Acute Toxicity Classification (MRID)**	**NOAEC / LOAEC (µg ai/L)**	**Affected Endpoints (MRID)**
Rainbow Trout *Oncorhynchus mykiss*	810	--	highly toxic (42245107)	--	--
Fathead minnow *Pimephales promelas*	--	--	--	NOAEC = 8.7 LOAEC = 19.0	larval length at 30 days post hatch (42245115)
Water flea *Daphnia magna*	--	770	highly toxic (42245110)	NOAEC = 5.6 LOAEC =13.0	number of young/adult/ reproduction day and adult length (42245114)
Sheepshead minnow *Cyprinodon variegatus*	819	--	highly toxic (42245112)	NOAEC = 8.8*	--
Eastern oyster *Crassostrea virginica*	--	96hr EC_{50} = 424	highly toxic (42906701)	--	--
Mysid shrimp *Americamysis bahia*	150	--	highly toxic (42245111)	NOAEC < 0.115	number of young/adult/ reproduction day (46950133)
Duckweed (*Lemna gibba*)	EC_{50} = 1900		469205-04	--	--
FW Diatom (*Navicula pelliculosa*)	EC_{50} = 98		469205-08	--	--

* A chronic estuarine/marine fish study was not provided. Estimated value is based on the assumption that the estuarine/marine fish acute to chronic ratio is similar to the freshwater fish acute to chronic ratio.

Table 9. Summary of Acute and Chronic Toxicity Data for Terrestrial Organisms Exposed to Difenoconazole.

Species	Acute Toxicity				Chronic Toxicity	
	LD_{50}	**Acute Oral Toxicity (MRID)**	**5-day LC_{50}**	**Subacute Dietary Toxicity (MRID)**	**NOAEC / LOAEC**	**Affected Endpoints (MRID)**
Bobwhite quail			4579 mg ai/kg-diet	Slightly toxic (42245103)	NOAEC = 21.9 mg ai/kg-diet LOAEC = 108 mg ai/kg-diet	significant reduction in hatchling body weight observed at 108 mg ai/kg-diet significant reduction is eggs laid occurred at 539 mg ai/kg-diet; (46950202)
Mallard duck	>2150 mg ai/ kg-bwt	practically non toxic (42245105)				
Laboratory rat	1453 mg ai/kg-bwt	slightly toxic (42090006)				
Laboratory rat					NOAEC = 25 mg ai/kg-diet LOAEC = 250 mg ai/kg-diet	decreased maternal body weight gain, decreased pup weights at day 21 (42090018)
Honey bee	>100 µg ai/bee	practically non toxic (42245124)				
Earthworm	> 610 mg/kg dw	42245125				
Terrestrial Plants	No phytotoxic effects were observed in any species at the five treatments tested following pre- or post-emergence application (NOAEC > 0.44 lb a.i./A)					469502-03

Acute Toxicity to Freshwater Fish

Toxicity data are available for acute freshwater fish for difenoconazole. Results of acute toxicity tests with freshwater fish are tabulated in Table D-1. Because the LC_{50} values for the species

tested range between 810 to1200 µg ai/ L with toxicity tests for rainbow trout and bluegill sunfish respectively, difenoconazole is classified as moderately to highly toxic to freshwater fish on an acute exposure basis. For this risk assessment, the LC_{50} = 810 µg ai/L was used for determination of the freshwater fish Acute RQ. Acute toxicity testing with rainbow trout (MRID 422451-07) and bluegill sunfish (MRID 422451-09) are consistent with Guideline §72-1(a) and §72-1(c) testing requirements and are classified as acceptable.

Chronic Toxicity to Freshwater Fish

A freshwater fish early life stage test using the TGAI was submitted for difenoconazole (MRID 422451-15) using the preferred test species, fathead minnow (Table D-3). Under the conditions of the test the NOAEC was 8.7 and the LOAEC was 19.0 µg ai/L, and the most sensitive biological parameter was larval length at 30 days post hatch. This study was classified as supplemental because the relative standard deviation for fish weight (50%) in one of the control replicates was greater than the acceptable level of 40% variability. In addition, contamination with the test chemical was observed in two control replicates.

Acute Toxicity to Freshwater Invertebrates

Acute toxicity data for difenoconazole using the TGAI are available for the preferred test species, *Daphnia magna* (Table D-2). The 48-hr LC_{50} value for daphnids was 770 µg ai/L (MRID 422451-10). Based on the results of this study, which is scientifically sound and classified as acceptable, difenoconazole is categorized as highly toxic to the daphnid on an acute toxicity basis. Mortality and/or sublethal effects were observed in all treatment groups.

Chronic Toxicity to Freshwater Invertebrates

A freshwater aquatic invertebrate life-cycle test using the TGAI was submitted for difenoconazole (MRID 422451-14) using the preferred species, *D. magna* (Table D-4). The respective NOAEC and LOAEC values were 5.6 µg a.i./L and 13.0 µg a.i./L, based on mean measured concentrations. The number of young per adult per reproduction day and adult length were significantly reduced at concentrations greater than or equal to 13 µg ai/L. The study is scientifically sound, consistent with Guideline §72-4(b). This study was upgraded to acceptable classification.

Acute Toxicity to Estuarine/Marine Fish

Two estuarine/marine fish acute toxicity tests using the TGAI were submitted for difenoconazole using the preferred test species, sheepshead minnow (MRIDs 422451-12 and 429067-02). Both of these studies were classified as Acceptable. The results of these tests are provided in Table D-1. The 96 hour LC_{50} of 819 µg ai/L classifies difenoconazole highly toxic to the sheepshead minnow (MRID 422451-12).

Chronic Toxicity to Estuarine/Marine Fish

No data were available to assess the chronic toxicity of difenoconazole to estuarine/marine fish. The LC_{50}s for estuarine/marine fish were comparable to the LC_{50}s for freshwater fish, suggesting similar acute sensitivity to difenoconazole. In the absence of data, an approach based on the acute to chronic ratio (ACR) from the freshwater fish data was used to estimate a NOAEC for estuarine/marine fish. The most conservative acute value of 819 µg ai/L was used for estuarine/marine fish. The most sensitive LC50 value (810 µg ai/L, rainbow trout) and chronic NOAEC value (8.7 µg ai/L, fathead minnow) for freshwater fish were used to estimate a fish ACR. An estimated NOAEC value of 8.8 µg ai/L was derived for estuarine/marine fish based on the assumption that the acute (LC_{50}) to chronic (NOAEC) ratio for estuarine/marine fish (819 µg ai/L: chronic) is the same as freshwater fish (810 µg ai/L : 8.7µg ai/L). There are uncertainties with calculating this acute to chronic ratio for freshwater fish because it involves extrapolating between two freshwater fish, the rainbow trout and the fathead minnow. These species may have different sensitivities to this chemical. In addition, extrapolation from freshwater to estuarine/marine chronic NOAEC values is possible; however, there is uncertainty associated with this assumption because quantifiable taxonomic sensitivity factors between the two broad categories of fish do not exist.

Acute Toxicity to Estuarine/Marine Invertebrates

Acute difenoconazole toxicity data are available for mysid shrimp and the Eastern oyster and are summarized in Table D-2. The 96-hour mysid shrimp LC_{50} is 150 µg ai/L (MRID 422451-11); therefore, difenoconazole is classified as highly toxic to estuarine/marine crustaceans on an acute exposure basis. The acute mysid study is scientifically sound and is classified as acceptable. Difenoconazole is also highly toxic to mollusks, with an $EC_{50} > 300$ µg ai/L (MRID 42245113). This acute mollusk study is scientifically sound is classified as acceptable. An additional mollusk study was submitted that resulted in an $EC_{50} = 424$ µg ai/L (MRID 42906701). This acute mollusk study is scientifically sound is classified as acceptable. For this risk assessment, the $EC_{50} = 424$ µg ai/L was used for determination of the estuarine/marine mollusk acute RQ because it is a definitive value.

Chronic Toxicity to Estuarine/Marine Invertebrates

The life cycle toxicity of difenoconazole to mysids (*Americamysis bahia*) was assessed over 28 days and is summarized in Table D-5. The NOAEC value for reproduction based on number offspring/female/ reproduction day was <0.115 µg ai/L. A definitive NOAEC for reproduction could not be determined because there were significant adverse effects on reproductive success at all treatment levels compared to the negative control (42-68%). The NOAEC value for growth based on male dry weight was 0.311 µg ai/L. The most conservative endpoint (NOAEC < 0.115 µg ai/L) was used in risk assessment.

This toxicity study is classified as supplemental because there was a slight difference (3%) between negative and solvent control for female body length of solvent control mysids. Female body length was lower (3-5%) than the negative control at all treatment levels. In addition, this

study is classified as supplemental because a nondefinitive NOAEC was not determined for reproduction and relatively high analytical variability was observed at all treatment levels except nominal 3.00 µg ai/L, with measured concentrations exceeding 20% among results (24-43% difference).

Toxicity to Aquatic Plants

Aquatic plant data were submitted for four species of alga studies and one vascular plant (*Lemna gibba*) as required by EPA guidelines. Details of these studies are presented in Table D-5. Three of the non-vascular plant studies were classified as acceptable and included a freshwater green algae (*Pseudokirchneriellam subcapitata,* EC_{50} = 0.30 mg a.i./L, MRID 469205-12), a freshwater diatom (*Navicula pelliculosa,* EC_{50} = 0.098 mg a.i./L, MRID 469205-08) and a marine diatom (*Skeletonema costatum,* EC_{50} = 0.43 mg a.i./L, MRID 469205-10*)*. The vascular plant, duckweed (*Lemna gibba*) indicated an EC_{50} = 1.90 mg/L (MRID 469205-04) which was classified as acceptable. In addition, a freshwater, blue-green algae (*Anabean flos-aquae*, MRID 469205-06*)* was submitted, however this study was classified as invalid due to instability of the test substance and variability in the test results. For the purposes of this risk assessment, the most sensitive algae, the marine diatom (*Navicula pelliculosa*) was used (EC_{50} = 0.098 mg/L, NOAEC = 0.053 mg/L) for calculations of risk quotients and the *Lemna gibba* (EC_{50} of 1.9 mg/L, EC_{05} = 0.11 mg/L) was used to represent vascular plants.

Acute and Subacute Toxicity to Birds

The acute oral LD_{50} in the mallard duck exceeded the highest dose tested (>2150 mg ai/kg-bw, MRID 42245105; Table D-7). There was no mortality during the study. Difenoconazole is classified as practically non-toxic to birds on an acute exposure basis. The study is classified as acceptable.

The results of the dietary studies for the preferred test species, bobwhite quail and mallard duck, are summarized in Table D-7. In the quail dietary study (MRID 42245103), the LC_{50} = 4579 mg ai/kg-diet, which categorizes difenoconazole as slightly toxic to the bobwhite quail on an acute dietary basis. In the mallard dietary study (MRID 42245104), the LC_{50} exceeded the highest test concentration, >5000 mg ai/kg-diet, which categorizes difenoconazole as practically non-toxic to the mallard duck on an acute dietary basis. Both dietary studies are classified as acceptable and are consistent with Guideline §71-2 subacute avian dietary testing requirements.

Chronic Toxicity to Birds

Two avian reproduction dietary studies, which are summarized in Table D-8, were submitted to the Agency. In the mallard duck study (MRID 42245106), significant egg shell thinning was detected at 625 mg ai/kg-diet (p=0.039); no other reproductive effects were noted. Therefore, the NOAEC was determined to be 125 mg ai/kg-diet and the LOAEC was 625 mg ai/kg-diet. The avian reproduction study is scientifically sound; however, it is classified as acceptable (raw data on a per pen basis was submitted).

In the bobwhite quail study (MRID 46950202), there was a significant reduction in hatchling weight at the 108 mg ai/kg diet (6%) and 539 mg ai/kg diet (10%) treatment levels resulting in a NOAEC of 21.9 mg ai/kg diet for growth. Numerous reproductive parameters were significantly reduced at the 539 mg ai/kg treatment level, resulting in a reproductive NOAEC of 108 mg ai/kg diet. The reproductive effects included a reduction in the number of eggs laid, eggs set, viable embryos, live embryos, number hatched, hatchling survival, survivor weights. Additionally, female weight gain was adversely affected the highest treatment level (539 mg ai/kg). This toxicity study is classified as acceptable. The most conservative endpoint (NOAEC = 21.9 mg ai/kg diet) for birds was used in risk quotient calculation.

Acute and Chronic Toxicity to Mammals

In most cases, mammalian toxicity data from the Agency's Health Effects Division (HED) are used to approximate toxicity to wild mammals. However, wild mammal toxicity tests may be required on a case-by-case basis, depending on the results of lower tier toxicity studies such as acute and sub-acute testing, intended use pattern, and pertinent environmental fate characteristics. The registrant has not conducted toxicity testing on wild mammal species. For the purposes of this risk assessment, the available mammalian toxicity data on laboratory mammals was used in the absence of toxicity data on mammalian wildlife (Tables D-9 and D-10).

When administered in an oral dose as a gavage to rats, the resulting LD_{50} was 1453 mg ai/kg-bwt (MRID 420900-06). Chronic effects of difenoconazole were observed in a 2-generation reproduction study with rats (MRID 420900-18) where both the parental and offspring NOAECs were determined to be 25 mg ai/kg-diet and the LOAEC was 250 mg ai/kg-diet. The parental NOAEC was based on decreased maternal body weight gain and the offspring NOAEC was based on decreased pup weights at day 21. These studies are discussed in more detail in the toxicity chapter provided by HED.

Acute Toxicity to Non-target Insects (Honey Bee)

The results of acute contact testing of difenoconazole on the honey bee are summarized in Table D-11. By 48 hours in the contact test, the LD_{50} >100µg a.i./bee (MRID 422451-24). As a result, difenoconazole is categorized as practically non-toxic to honeybees on an acute contact basis.

Acute Toxicity to Earthworms

The results of acute contact testing of difenoconazole on earthworms are summarized in Table D-12. The LC_{50} was >610 mg ai/kg dw of substrate, as survival was >95% in all treatment groups. No significant differences were detected in any treatment groups relative to the negative control for survival or weight change. The NOAEC and LOAEC based on survival and weight change, were 610 and >610 mg ai/kg dw of substrate. The active ingredient is considered to be non-toxic to earthworms up to concentration of 610 mg ai/kg dw of substrate.

Toxicity to Non-target Terrestrial Plants

A non-GLP study was carried out as a part of routine discovery screening and efficacy test, to investigate the potential for adverse effects of difenoconazole on terrestrial non-target higher plants (MRID 46950203). Using a standardized study protocol, tests were carried out on seedling emergence and vegetative vigor of two monocot and four dicot plant species. Nominal application rates were 0 (negative control), 0.0275, 0.055, 0.11, 0.22 and 0.44 lbs ai/A. The duration of the seedling emergence test was 23 days after application and the duration of the vegetative vigor test was 17 days after application. Visible phytotoxicity (including emergence and mortality) was used as the only toxic endpoint. No phytotoxic effects were observed in any species at any treatment following pre- or post-emergence application.

The study author reported that these studies were conducted following OPPTS 850.4100 and 850.4150 guidance; however, they were conducted as screening tests using visible phytotoxic effects as the only endpoint. This study is classified as SUPPLEMENTAL as the study did not follow guidelines procedures but may provide useful information for qualitative risk assessment purposes. Because there were a limited number of species tested and growth and other required endpoints were not included in this study, the results cannot be used quantitatively in risk assessment.

4.2 Incident Data Review

A review of the EIIS database for ecological incidents involving difenoconazole was completed on June 14, 2007. There were no difenoconazole incidents in the database.

Incident reports submitted to EPA since approximately 1994 have been tracked by assignment of I #s in an Incident Data System (IDS), microfiched, and then entered to a second database (in EFED), the Ecological Incident Information System (EIIS). An effort has also been made to enter information to EIIS on incident reports received prior to establishment of current databases. Incident reports are often not received in a consistent format (e.g., states and various labs usually have their own formats), may involve multiple incidents involving multiple chemicals in one report, and may report on only part of a given incident investigation (e.g., residues).

It is believed that the EFED database contains reports of only a small portion of plant and animal wildlife incidents that actually occur as a result of pesticide use. Mortality incidents must be seen, reported, investigated, and have had investigation reports submitted to EPA to have the potential to get entered into a database. Incidents often are not seen, especially if the affected organisms are inconspicuous or few people are systematically looking, for example. Some reasons that observed incidents may not be reported to appropriate authorities capable of investigating the incident include: the finder may not know of the importance of reporting incidents, may not know who to call, or may not feel they have the time or desire to call.

5.0 RISK CHARACTERIZATION

Risk characterization is the integration of exposure and effects characterization to determine the potential ecological risk from the use of difenoconazole and the likelihood of effects on aquatic life, wildlife, and plants based on varying pesticide-use scenarios. No data, however, are available for plants but will be required for further new uses. The risk characterization provides an estimation and a description of the risk; articulates risk assessment assumptions, limitations, and uncertainties; synthesizes an overall conclusion; and provides the risk managers with information to make regulatory decisions.

5.1 Risk Estimation - Integration of Exposure and Effects Data

Results of the exposure and toxicity effects data are used to evaluate the likelihood of adverse ecological effects on non-target species. For the assessment of difenoconazole risks, the risk quotient (RQ) method is used to compare exposure and measured toxicity values. Estimated environmental concentrations (EECs) are divided by acute and chronic toxicity values. The RQs are compared to the Agency's levels of concern (LOCs). These LOCs are the Agency's interpretive policy and are used to analyze potential risk to non-target organisms and the need to consider regulatory action. These criteria are used to indicate when a pesticide's use as directed on the label has the potential to cause adverse effects on non-target organisms.

5.1.1 Non-target Aquatic Animals

Surface water concentrations resulting from difenoconazole application to selected crops were predicted with the PRZM-EXAMS model. The assessment was based on the proposed use of difenoconazole on cucumbers, watermelons and cantaloupes in Georgia. These uses were represented by the FL cucumber and GA onion scenarios. The CA almond scenario was used to represent the use on almonds.

Peak EECs were then compared to acute toxicity endpoints to derive acute RQs. The 60-day EECs were compared to chronic toxicity endpoints (NOAEC values) to derive chronic RQs for fish, and 21-day EECs were compared to chronic toxicity endpoints for invertebrates. Acute and chronic RQs for freshwater and estuarine/marine organisms are summarized in **Table 10**.

There are no acute LOCs exceeded for freshwater fish and invertebrates and estuarine/marine fish and mollusks for all of the proposed crops. In addition, there are no LOCs exceeded for aquatic plants. There are no chronic LOCs exceeded for fish. Chronic LOCs are slightly exceeded for freshwater invertebrates for the FL cucumber scenario (RQs = 1.02 – 1.08) and the GA onion scenario (RQ = 1.04). Chronic LOCs are exceeded for estuarine/marine crustaceans for both of the proposed uses (RQs range from > 6.7 to > 52.4).

Table 10. Risk Quotients for Aquatic Species for Parent Difenoconazole for Aerial (A) and Ground (G) Application.

Use		Freshwater Fish and Amp. RQs LC_{50} = 810 ppb NOAEC = 8.7 ppb		Freshwater Invertebrate RQs EC_{50} = 770 ppb NOAEC = 5.6 ppb		Estuarine/Marine Fish RQs LC_{50} = 819 ppb NOAEC = 8.8 ppb*		Estuarine/Marine Mysid RQs EC50 = 150 ppb NOAEC <0.115 ppb	
		acute	chronic	acute	chronic	acute	chronic	acute	chronic
CA Almond	A	<0.01	0.14	<0.01	0.24	<0.01	0.14	0.01	**>11.48+**
	G	<0.01	0.09	<0.01	0.14	<0.01	0.08	<0.01	**>6.7+**
FL cucumber	A	<0.01	0.64	<0.01	**1.08+**	<0.01	0.63	0.05	**>52.44+**
	G	<0.01	0.59	<0.01	**1.02+**	<0.01	0.58	0.05	**>49.65+**
GA Onion	A	<0.01	0.62	<0.01	**1.04+**	<0.01	0.61	0.05	**>50.44+**
	G	<0.01	0.56	<0.01	0.94	<0.01	0.55	0.04	**>45.74+**

* Estimated value based on acute to chronic ratio for freshwater fish
\+ Exceeds Chronic Risk LOC (1.0)

Table 11. Risk Quotients for Aquatic Species for Parent Difenoconazole for Aerial (A) and Ground (G) Application

Use		Estuarine/Marine Oyster EC50 = 424 ppb	Aquatic Non-Vascular Plant (*Navicula pelliculosa*) EC_{50} = 98 ppb NOAEC = 53 ppb		Aquatic Non-Vascular Plant (*Lemna gibba*) EC_{50} = 1900 ppb NOAEC = 110 ppb	
		acute	Non-endangered	Endangered	Non-endangered	Endangered
CA Almond	A	<0.01	0.02	0.03	<0.01	0.01
	G	<0.01	0.01	0.02	<0.01	0.01
FL cucumber	A	0.02	0.07	0.14	<0.01	0.07
	G	0.02	0.07	0.13	<0.01	0.06
GA Onion	A	0.02	0.07	0.13	<0.01	0.06
	G	0.02	0.06	0.12	<0.01	0.06

5.1.2 Non-target Terrestrial Animals

The EEC values for terrestrial exposure were based on the labeled application rate. Risk quotients are based on the most sensitive LD_{50} (acute oral toxicity study) and NOAEC (chronic toxicity study) for birds and mammals and are calculated by dividing the EEC by the appropriate toxicity endpoint. There was no dose-related mortality in the acute dose-based avian study; therefore, RQs were not calculated.

Acute and chronic RQs for birds are summarized in Tables 12-13; acute and chronic RQs for mammals are summarized in Table 14-15. There were no acute LOC exceedances for birds or mammals. The chronic LOCs were exceeded for both birds and mammals. Avian dietary-based chronic LOCs were exceeded for all food groups except fruits, pods, seeds, and large insects (RQs = 1.03 – 4.10). Mammalian dose-based chronic LOCs were exceeded for all food groups except seeds (RQs = 1.07 – 30.15). Mammalian dietary-based chronic LOCs were exceeded for all food groups except fruits, pods, seeds, and large insects (RQs = 1.11 – 3.59).

Table 12. Avian dietary-based acute and chronic RQ values for proposed uses of difenoconazole based on LC_{50} = 4579 mg a.i./kg diet and NOAEC = 21.9 mg a.i./kg- diet and upper-bound Kenaga residues.

Use/App. Method	Application Rate (# app / interval, days)	Food Items	Acute Dietary RQ (EEC/ LC_{50})	Chronic RQ (EEC/ NOAEC)
Almonds	0.11 lbs. ai/A (2, 7)	Short grass	0.01	**2.25+**
		Tall grass	<0.01	**1.03+**
		Broadleaf plants/small insects	0.01	**1.27+**
		Fruits, pods, seeds, and large insects	<0.01	0.14
Cucurbits	0.114 lbs. ai/A (4, 7)	Short grass	0.02	**4.10+**
		Tall grass	0.01	**1.88+**
		Broadleaf plants/small insects	0.01	**2.31+**
		Fruits, pods, seeds, and large insects	<0.01	0.26

+ Exceeds Chronic Risk LOC (≥1.0)

Table 13. Mammalian dose-based acute RQ values for Difenoconazole based on a rat LD_{50} = 1453 mg/kg-bw and upper-bound Kenaga values.

Use/App. Method	Application Rate (# app / interval, days)	Body Weight (g)	Mammalian Acute Risk Quotients (upper-bound Kenaga residues)				
			Short Grass	Tall Grass	Broadleaf Plants/Small Insects	Fruits/pods/ large insects	Seeds
Almonds	0.11 lb a.i./A (2, 7)	15	0.01	0.01	0.01	<0.01	<0.01
		35	0.01	0.01	0.01	<0.01	<0.01
		1000	0.01	<0.01	<0.01	<0.01	<0.01
Cucurbits	0.114 lb a.i./A (4, 7)	15	0.03	0.01	0.02	<0.01	<0.01
		35	0.02	0.01	0.01	<0.01	<0.01
		1000	0.01	0.01	0.01	<0.01	<0.01

* Exceeds Acute Endangered LOC (≥0.1)
** Exceeds Acute Restricted Use LOC (≥0.2)
*** Exceeds Acute Risk LOC (≥0.5)

Table 14. Mammalian dose-based chronic RQ values for proposed uses of difenoconazole based on a rat calculated NOAEL = 25 mg/kg-bw and upper-bound Kenaga values.

Use/App. Method	Appl. Rate lbs. a.i./A (# app / interval, days)	Body Wgt (g)	Mammalian Chronic Risk Quotients (upper-bound Kenaga residues)				
			Short Grass	Tall Grass	Broadleaf Plants/Small Insects	Fruits/pods/ large insects	Seeds
Almonds	0.11 lb a.i./A (2, 7)	15	**17.14+**	**7.85+**	**9.64+**	**1.07+**	0.24
		35	**14.64+**	**6.71+**	**8.23+**	0.91	0.20
		1000	**7.85+**	**3.60+**	**4.41+**	0.49	0.11
Cucurbits	0.114 lb a.i./A (4, 7)	15	**30.15+**	**14.28+**	**17.52+**	**1.95+**	0.43
		35	**26.61+**	**12.20+**	**14.97+**	**1.66+**	0.37
		1000	**14.26+**	**6.54+**	**8.02+**	0.89	0.20

+ Exceeds Chronic Risk LOC (≥1.0)

Table 15. Mammalian dietary-based chronic RQ values for proposed uses of difenoconazole based on rat NOAEC = 25 mg/kg-diet and upper-bound Kenaga residues.

Use/App. Method	Application Rate lbs. ai/A (# app / interval, days)	Food Items	Chronic RQ (EEC/ NOAEC)
Almonds	0.11 lb a.i./A (2, 7)	Short grass	**1.98+**
		Tall grass	0.91
		Broadleaf plants/small insects	**1.11+**
		Fruits, pods, seeds, and large insects	0.12
Cucurbits	0.114 lb a.i./A (4, 7)	Short grass	**3.59+**
		Tall grass	**1.65+**
		Broadleaf plants/small insects	**2.02+**
		Fruits, pods, seeds, and large insects	0.22

+ Exceeds Chronic Risk LOC (≥1.0)

5.1.3 Non-target Terrestrial, Semi-aquatic, and Aquatic Plants

A non-GLP study was carried out as a part of routine discovery screening and efficacy test, to investigate the potential for adverse effects of difenoconazole on terrestrial non-target higher plants. Tests were carried out on seedling emergence and vegetative vigor of two monocot and four dicot plant species. The test included observations of visible effects on seedling emergence and vegetative vigor. No phytotoxic effects were observed in any species at the five treatments

tested following pre- or post-emergence application (NOAEC > 0.44 lb a.i./A). Because there were a limited number of species tested and growth and other required endpoints were not included in this study, the results cannot be used quantitatively in this risk assessment. The maximum application rates for curcurbits in GA and almonds in CA is 0.44 lb a.i./A per season. Therefore, at the proposed application rates, adverse affects to non-target terrestrial plants are not expected based on the visually phytotoxicity testing completed; however, definitive RQs cannot be calculated.

5.1.4 Nontarget Insects

EFED currently does not quantify risks to terrestrial non-target insects. Risk quotients are therefore not calculated for these organisms. Difenoconazole was classified as practically non-toxic based on the acute contact honey bee study (LD_{50}>100 µg/bee); therefore, the potential for difenoconazole to have adverse effects on pollinators and other beneficial insects is low.

Acute contact testing of difenoconazole on earthworms resulted in a LC_{50} > 610 mg ai/kg dw of substrate, as survival was >95% in all treatment groups. No significant differences were detected in any treatment groups relative to the negative control for survival or weight change. The NOAEC and LOAEC based on survival and weight change, were 610 and >610 mg ai/kg dw of substrate. The maximum proposed annual application rate (curcurbits) is 0.44 lbs a.i./acre/season. The proposed application rate was converted to terms of the residue concentration in mg a.i./kg dry soil in 6 inches of dry soil in one acre to compare the residue concentration to the NOAEC. Soil sampling and analysis generally assumes 2,000,000 lbs/acre of soil from 0–6 inches in depth. This weight per unit volume (bulk density) assumes a medium soil texture with some compaction typically found following cropping and harvest. The estimated residue of 0.22 mg a.i./kg dry soil is over three orders of magnitude less than the NOAEC of 610 mg a.i./kg based on the 14-day study; therefore, there is not potential risk of harmful effects to earthworms from difenoconazole application to curcurbits in GA and almonds in CA.

Calculation Steps (Brady 1974)

1. **0.44 lbs a.i./acre** * 454,000 mg/lbs = 199,760 mg a.i/acre
2. 2,000,000 lbs/6 inches of soil in one acre *
   454 g/lbs = 9.08×10^{8} g /6 inches of soil *
   1 kg/1000g = 9.08×10^{5} kg dry soil

3. 199,760 mg a.i/acre * 1 acre/9.08×10^{5} kg = **0.22 mg a.i./kg dry soil**

5.2 Risk Description - Interpretation of Direct Effects

5.2.1 Risks to Aquatic Organisms and Plants

Difenoconazole is a fungicide proposed to treat cucurbits in GA and almonds in CA. Following treatment, field runoff many contaminate adjacent ponds, streams, and lakes. Freshwater fish and invertebrates are not at an acute from exposure to difenoconazole (risk quotients were an order of magnitude less than the levels of concern) at the proposed application rates. There is also no chronic risk to fish. In addition, there is no risk to estuarine/marine fish and mollusks. There were no LOCs exceeded for aquatic plants, therefore, risk to aquatic plants are not expected.

Chronic LOCs are slightly exceeded for freshwater invertebrates for the Florida cucumber and Georgia onion scenarios which represents application to cucumbers, cantaloupes, and watermelons in Georgia (RQ = 1.02 (ground) - 1.08 (aerial)) based on four applications. In the daphnid life-cycle test the NOAEC value was based on a reduction in the number of young per adult per reproduction day and adult length. Therefore, there is a potential direct risk for freshwater invertebrates exposed to difenoconazole residues in the proposed use areas.

However, based on the proposed label language for Inspire Super MP, it is recommended for resistence management that Inspire Super MP be used in the blocking program using the maximum of two consecutive applications before rotating to fungicides with another mode of action registered for those uses. For the aquatic assessment, four consecutive difenoconazole applications were modeled. The current version of PRZM-EXAM does not allow modeling alternated applications as recommended by registrant in the proposed label. Therefore, the modeling of cucurbits may be conservative with regard to the application regime. At two consecutive applications, there is no potential chronic risk to freshwater invertebrates.

Chronic LOCs are also exceeded for estuarine/marine crustaceans for both of the proposed crops with RQs almost two orders of magnitude greater than the LOC (1.0). The RQs are based on the mysid life cycle toxicity test which resulted in a reproduction nondefinitive NOAEC <0.115 µg ai/L based on number offspring/female/ reproduction day. There were significant adverse effects on reproductive success at all treatment levels compared to the negative control (42-68%). The NOAEC value for growth based on male dry weight was 0.311 µg ai/L. When RQs are calculated based on the NOAEC for growth, LOCs are also exceeded for all proposed crops. Therefore, there is a potential direct risk for estuarine/marine crustaceans exposed to difenoconazole residues in the proposed use areas of cucurbits in Georgia and almonds in California that are coastal areas.

5.2.2 Risks to Terrestrial Organisms and Plants

The results of the terrestrial risk characterization suggest that there are no acute risks associated with avian and mammalian exposures to difenoconazole. However, there are chronic risk concerns based on the submitted bird and mammal data. Risk quotients were not calculated for insects, however it was determined that there is no potential for difenoconazole to have adverse effects on

these species. A qualitative study was submitted for terrestrial plants and while no toxic effects were observed, risk cannot be precluded at this time. The risks associated with terrestrial organisms are discussed in greater detail below.

Birds

There is no dose-base risk to birds; however, dietary-based chronic LOCs were exceeded for all food groups except fruits, pods, seeds, and large insects for both of the proposed crops. At two consecutive applications RQs range from 1.03 – 2.25. At four consecutive applications, RQs range from 1.88 to 4.10. Based on this analysis, listed and non-listed birds that feed on grasses and broadleaf plants may be at risk of experiencing chronic and reproductive effects if exposed to difenoconazole.

The chronic toxicity study showed that extended exposure to difenoconozole led to adverse effects on bird reproduction. The predicted EECs of 5.61 – 89.77 mg a.i./kg-diet are comparable to the effect levels observed in the bobwhite quail study (NOAEC = 21.9 mg a.i./kg, MRID 469502-02). The RQs calculated in this assessment are based on the significant reduction in hatchling weight at the 108 mg ai/kg diet (6%) and 539 mg ai/kg diet (10%) treatment levels resulting in a NOAEC of 21.9 mg ai/kg diet for growth. Additionally, female weight gain was adversely affected the highest treatment level (539 mg ai/kg). Numerous reproductive parameters were significantly reduced at the 539 mg ai/kg treatment level, resulting in a reproductive NOAEC of 108 mg ai/kg diet. The reproductive effects included a reduction in the number of eggs laid, eggs set, viable embryos, live embryos, number hatched, hatchling survival, survivor weights.

Mammals

Mammalian acute RQs are less than LOCs, with acute values ranging from <0.01 to 0.03. Mammalian dose-based chronic LOCs were exceeded for all food groups except seeds (RQs = 1.07 – 30.15) based on two and four consecutive applications. Mammalian dietary-based chronic LOCs were exceeded for all food groups except fruits, pods, seeds, and large insects (RQs = 1.11 – 3.59) based on two and four consecutive applications.

EFED based chronic RQs in mammals on the NOAEC for difenoconoazole in a 2-generation rat reproduction study (MRID 422451-18). The predicted EECs of 5.61 – 89.77 mg ai/kg-diet are comparable to the observed effect level seen in the laboratory rat study. The risk quotient is based on weight reduction in pups (NOAEC = 25 mg/kg-diet or NOAEL = 1.25 mg/kg-bw/day). At the 250 mg ai/kg diet treatment level, a dose-related, but not statistically significant, decrease in F_0 female body weights was observed. Also at 250 mg ai/kg diet, there was a statistically significant reduction in body weights of F_1 males. At 2500 mg ai/kg diet, there was a significant reduction in male pup survival. For this endpoint (male pup survival) the NOAEC would be 250 mg ai/kg diet. This latter endpoint is consistent with the NOAEL observed for developmental effects (increases in post-implantation loss and resorptions) in rabbits (NOAEL = 25 mg/kg-bw/day, MRID 42090017) and the NOAEL for developmental toxicity based on increased skeletal abnormalities in rats (100

mg/kg-bw/day, MRID 42090016). When RQs are calculated using that NOAEC based on male pup survival (250 mg ai/kg diet) chronic dietary-based LOCs are no longer exceeded but chronic dose-based LOCs are still exceeded.

Using this higher NOAEC for more frank adverse effects would result in lower RQs. However, weight reduction in pups is still a potentially important endpoint of concern, as reduced weight gain may cause reduced fitness, which may in turn impact survival and other fitness parameters (reproduction success, ability to environmental incidents such as drought, heat, cold, or flooding, etc.).

With both dose-and dietary RQs exceeding LOCs, listed and non-listed mammals that feed on grasses, broadleaf plants, fruits, pods, and large insects are at risk of experiencing chronic and reproductive effects if exposed to difenoconazole. Granivores are not expected to be at potential risk.

Terrestrial Plants

A visible phytotoxicity (including emergence and mortality) test was carried out on seedling emergence and vegetative vigor of terrestrial plant species. No phytotoxic effects were observed in any species at the five treatments tested following pre- or post-emergence application (NOAEC > 0.44 lb a.i./A). At the proposed application rates, adverse affects to non-target terrestrial plants are not expected based on the visually phytotoxicity testing completed; however, definitive RQs cannot be calculated.

Non-Target Insects

EFED currently does not quantify risks to terrestrial non-target insects. Risk quotients are therefore not calculated for these organisms. Difenoconazole was classified as practically non-toxic based on the acute contact honey bee study (LD_{50}>100 µg/bee); therefore, the potential for difenoconazole to have adverse effects on pollinators and other beneficial insects is low.

Acute contact testing of difenoconazole on earthworms resulted in a LC_{50} greater than 610 mg ai/kg dw of substrate (NOAEC = 610 mg ai/kg dw), as survival was >95% in all treatment groups. No significant differences were detected in any treatment groups relative to the negative control for survival or weight change. The proposed application rate for ornamentals was converted to terms of the residue concentration in mg a.i./kg dry soil in 6 inches of dry soil in one acre to compare the residue concentration to the NOAEC. The estimated residue of 0.280 mg a.i./kg dry soil is over three orders of magnitude less than the NOAEC of 610 mg a.i./kg based on the 14-day study; therefore, the risk of harmful effects to earthworms from difenoconazole application to ornamentals, vegetables, and pome fruit is low.

5.3 Threatened and Endangered Species (Listed Species) Concerns

5.3.1 Action Area

For listed species assessment purposes, the action area is considered to be the area affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. At the initial screening-level, the risk assessment considers broadly described taxonomic groups and so conservatively assumes that listed species within those broad groups are collocated with the pesticide treatment area. This means that terrestrial plants and wildlife are assumed to be located on or adjacent to the treated site and aquatic organisms are assumed to be located in a surface water body adjacent to the treated site. The assessment also assumes that the listed species are located within an assumed area, which has the relatively highest potential exposure to the pesticide, and that exposures are likely to decrease with distance from the treatment area. This risk assessment presents the use of difenoconazole on almonds in California and curcurbits in Georgia and establishes initial collocation of species with treatment areas.

If the assumptions associated with the screening-level action area result in RQs that are below the listed species LOCs, a "no effect" determination conclusion is made with respect to listed species in that taxa, and no further refinement of the action area is necessary. Furthermore, RQs below the listed species LOCs for a given taxonomic group indicate no concern for indirect effects upon listed species that depend upon the taxonomic group covered by the RQ as a resource. However, in situations where the screening assumptions lead to RQs in excess of the listed species LOCs for a given taxonomic group, a potential for a "may affect" conclusion exists and may be associated with direct effects on listed species belonging to that taxonomic group or may extend to indirect effects upon listed species that depend upon that taxonomic group as a resource. In such cases, additional information on the biology of listed species, the locations of these species, and the locations of use sites could be considered to determine the extent to which screening assumptions regarding an action area apply to a particular listed organism. These subsequent refinement steps could consider how this information would impact the action area for a particular listed organism and may potentially include areas of exposure that are downwind and downstream of the pesticide use site.

5.3.2 Taxonomic Groups Potentially at Risk

Based on available screening level information, for the proposed uses of difenoconaozle, acute LOCs are not exceeded for freshwater fish and invertebrates; estuarine/marine fish and mollusks; and aquatic plants. However, chronic LOCs are slightly exceeded for freshwater invertebrates for the Georgia curcurbits at four consectutive applications (LOCs are not exceeded after two applications). Chronic LOCs are also exceeded for estuarine/marine crustaceans for all of the proposed scenarios with RQs almost two orders of magnitude greater than the LOC (1.0). Threatened and endangered aquatic species may potentially be affected through chronic exposure. Risk to listed freshwater and marine invertebrates in Georgia was assessed based on direct effects.

There are no acute LOC's exceeded for mammals or birds. The chronic LOC's are exceeded for birds and mammals consuming all food groups, except seeds. Threatened and Endangered birds and mammals may potentially be affected through chronic exposure.

A summary of the potential for direct and indirect effects to listed species, summarized by taxonomic group, is provided in **Table 19**. Based on available screening-level information, the greatest concerns for ecological risks based on exposure to difenoconazole lie with aquatic organisms, birds, mammals and unknown risk to terrestrial plants. Therefore, these species and the species that they represent as surrogates were identified as being of potential concern for direct and indirect effects.

The LOCATES database (version 2.9.7) was used to identify those U.S. counties that grow the proposed crops and that have federally-listed endangered or threatened species. In addition, federally-listed reptiles and amphibians (terrestrial phase) were also identified using LOCATES v2.9.7 as birds are used as their surrogate species. The complete list of the number of endangered and threatened species affected directly and indirectly in Georgia and four counties in CA is provided in **Appendix E and F,** respectively. With additional refinement by exploring more detailed species biology (e.g., geographic location, specific feeding habits, time of year likely to utilize crop fields), some species listed above may be determined to be not likely to be affected.

Listed plant species account for a large portion of the affected species, total followed by mammals, fish, birds and the other taxa. Although a lack of a definitive terrestrial plant study precludes a thorough assessment of the risks to terrestrial plants, at the very least, indirect effects on listed plant species are possible via direct effects on avian and mammalian pollinators. There are possible indirect affects to terrestrial plants that are pollinated and/or dispersed by birds and mammals. Reductions in populations in pollinators and dispersers may lead to decreases in certain flowering plant populations. Currently, none of the listed taxa can be discounted since for many, direct effects are expected and, in addition, indirect effects may be important for some species in all taxa given the risks of difenoconazole. In general, for all labeled uses of difenoconazole there is at least one, and usually more, listed species that may potentially occur in or near a use area. A more refined assessment should involve clear delineation of the action area associated with uses of difenoconazole and best available information on the temporal and spatial co-location of listed species with respect to the action area. This analysis has not been conducted for this assessment.

Table 16. Listed Species Risks Associated With Direct or Indirect Effects Due to Applications of Difenoconazole.		
Listed Taxonomy	**Direct Effects**	**Indirect Effects**
Terrestrial and semi-aquatic plants – monocots	Unknown [g]	Yes [f]
Terrestrial and semi-aquatic plants – dicots	Unknown [g]	Yes [f]
Terrestrial invertebrates	No	Unknown [g]
Birds	Chronic	Yes [c, d, e]
Terrestrial phase amphibians	Chronic [b]	Yes [c, d, e]
Reptiles	Chronic [b]	Yes [c, d, e]
Mammals	Chronic	Yes [c, d, e]
Aquatic vascular plants	No	No
Aquatic non-vascular plants [a]	No	No
Freshwater fish	No	Yes [e]
Aquatic phase amphibians	No	Yes [e]
Freshwater crustaceans	Chronic (GA curcurbits only at 4 consecutive applications)	Yes [e]
Estuarine/marine Mollusks	No	No
Estuarine/marine crustaceans	Chronic	No
Estuarine/marine fish	No	Yes [e]

[a] At the present time no aquatic non-vascular plants are included in Federal listings of threatened and endangered species. The taxonomic group is included here for the purposes of evaluating potential contributions to indirect effects to other taxonomy and as a record of exceedances should future listings of non-vascular aquatic plants warrant additional evaluation of Federal actions.
[b] Terrestrial phase amphibians and reptiles estimated using birds as surrogates. Aquatic amphibians estimated using freshwater fish as surrogates.
[c] Chronic LOC exceeded for some feeding guilds and size classes of birds.
[d] Chronic LOC exceeded for some feeding guilds and size classes of mammals.
[e] Potential Risk to freshwater and estuarine/marine crustaceans.
[f] Indirect effects may be caused by plants that rely on affected mammals, birds, amphibians, and reptiles as pollinators.
[g] Risk cannot be precluded because the terrestrial plant toxicity test was qualitative.

5.3.3 Use of Probit Slope Response Relationship to Provide Information on the Endangered Species Levels of Concern

The Agency uses the probit dose response relationship as a tool for providing additional information on the listed animal species acute levels of concern. The acute listed species LOCs of 0.1 and 0.05 are used for terrestrial and aquatic animals, respectively. As part of the risk characterization, an interpretation of acute LOCs for listed species is discussed. This interpretation is presented in terms of the chance of an individual event (i.e., mortality or immobilization) should exposure at the estimated environmental concentration actually occur for a species with sensitivity to difenoconazole on par with the acute toxicity endpoint selected for RQ calculation. To accomplish this interpretation, the Agency uses the slope of the dose response relationship available from the toxicity study used to establish the acute toxicity measurement endpoints for each taxonomic group. The individual effects probability associated with the LOCs is based on the mean estimate of the slope and an assumption of a probit dose response relationship. In addition to a single effects probability estimate based on the mean, upper and lower estimates of the effects probability are also provided to account for variance in the slope. The upper and lower bounds of the effects probability are based on available information on the 95% confidence interval of the slope. A statement regarding the confidence in the applicability of the assumed probit dose response relationship for predicting individual event probabilities is also included. Studies with good probit fit characteristics (i.e., statistically appropriate for the data set) are associated with a high degree of confidence. Conversely, a low degree of confidence is associated with data from studies that do not statistically support a probit dose response relationship. In addition, confidence in the data set may be reduced by high variance in the slope (i.e., large 95% confidence intervals), despite good probit fit characteristics.

Individual effect probabilities are calculated based on an Excel spreadsheet tool IECV1.1 (Individual Effect Chance Model Version 1.1) developed by Ed Odenkirchen of the U.S. EPA, OPP, Environmental Fate and Effects Division (June 22, 2004). The model allows for such calculations by entering the mean slope estimate (and the 95% confidence bounds of that estimate) as the slope parameter for the spreadsheet. In addition, the LOC (0.1 for terrestrial animals and 0.05 for aquatic animals) is entered as the desired threshold. There was no acute risk due to difenoconazole applied to cucurbits in GA and almonds in CA; therefore, the individual effect chance model was not completed.

5.3.4 Indirect Effect Analyses

The Agency acknowledges that pesticides have the potential to exert indirect effects upon the listed organisms by, for example, perturbing forage or prey availability, altering the extent of nesting habitat, etc. In conducting a screen for indirect effects, direct effect LOCs for each taxonomic group are used to make inferences concerning the potential for indirect effects upon listed species that rely upon non-endangered organisms in these taxonomic groups as resources critical to their life cycle.

Based on the chronic risks for birds and mammals on a dietary basis, there may be potential indirect effects to species of birds and mammals that depend on terrestrial organisms as a source of food. The chronic effects observed in the toxicity studies involved reductions in reproductive abilities for both taxa. Of particular concern would be the terrestrial wildlife populations that feed in or near almond orchards or cucurbit fields and those that rely on mammals or birds as a primary food source. There is a potential for wildlife exposure to difenoconazole residues in time and space. Non-listed and listed animals such as raptors (hawks and owls), coyotes, and foxes that feed on small mammals (cottontail rabbit, mice, voles, and other rodents) may be indirectly affected by chronic levels of difenoconazole found in their food source. Predators that feed on birds, including waterfowl, may also be affected by food chain transfer. Although difenoconazole does rapidly bioaccumulate, depuration is also rapid (MRID 422451-42), thereby reducing food chain effects of the residues. Other indirect effects, such as reduced prey availability, may occur if reductions in populations of small mammals or bird populations occur due to chronic residue exposure.

In addition, screening-level chronic LOCs are slightly exceeded for freshwater invertebrates for four consecutive applications to cucurbits (LOCs are not exceeded following two applications). Chronic LOCs are also exceeded for estuarine/marine crustaceans for all of the proposed scenarios. There may be potential indirect effects to listed and nonlisted terrestrial and aquatic species that depend on aquatic organisms as a source of food.

There also possible indirect affects to terrestrial plants that are pollinated and/or dispersed by birds and mammals. Reductions in populations in pollinators and dispersers may lead to decreases in certain flowering plant populations. A further evaluation of the listed plant species their relationship to birds to mammals along with the geographical and temporal nature of the exposure must be considered to determine if a rationale for a "not likely to adversely effect" determination for plants is possible.

Based on the screening level analysis, there may be a potential concern for indirect effects. As such, the nature of the chronic toxicological endpoint, Services-provided "species profiles", and further evaluation of the geographical and temporal nature of the exposure are considered to determine if a rationale for a "not likely to adversely effect" determination is possible.

5.4 Critical Habitat

In the evaluation of pesticide effects on designated critical habitat, consideration is given to the physical and biological features (primary constituent elements) of a critical habitat identified by the U.S Fish and Wildlife and National Marine Fisheries Services as essential to the conservation of a listed species and which may require special management considerations or protection. The evaluation of impacts for a screening level pesticide risk assessment focuses on the biological features that are primary constituent elements and is accomplished using the screening-level taxonomic analysis (RQs) and listed species' levels of concern (LOCs) that are used to evaluate direct and indirect effects to listed organisms.

The screening-level risk assessment for difenoconazole has identified potential concerns for direct and indirect effects on listed species for those organisms dependant upon small mammals, birds, freshwater and estuarine/marine invertebrates, and terrestrial plants. In light of the potential for indirect effects, the next step for EPA and the Service(s) is to identify which listed species and critical habitat are potentially implicated.

Analytically, the identification of such species and critical habitat can occur in either of two ways. First, the agencies could determine whether the action area overlaps critical habitat or the occupied range of any listed species. If so, EPA would examine whether the pesticide's potential impacts on non-endangered species would affect the listed species indirectly or directly affect a primary constituent element of the critical habitat. Alternatively, the agencies could determine which listed species depend on biological resources, or have constituent elements that fall into the taxa that may be directly or indirectly impacted by a pesticide. Then EPA would determine whether or not use of the pesticide overlaps the critical habitat or the occupied range of those listed species. At present, the information reviewed by EPA is not sufficient to permit use of either analytical approach to make a definitive identification of species that are potentially impacted indirectly or critical habitats that are potentially impacted directly by the use of pesticides. EPA and the Service(s) are working together to conduct the necessary analysis.

The tables in **Appendix E and F** state whether the listed speices co-occuring in the proposed use areas have designated critical habitat.

6.0 Key Uncertainties and Information Gaps

The following uncertainties and information gaps were identified:

- Difenoconazole may break down to form triazolyl acetic acid and further to triazole methanol and triazole. 1,2,4-Triazole and its conjugates (triazole alanine and triazole acetic acid) are common metabolites to the class of compounds known as the triazole-derivative fungicides (T-D fungicides, conazoles). A separate cumulative risk assessment was conducted on 1,2,4-trizole degradates. The Office of Pesticide Program's Health Effects Division (HED) has conducted aggregate human health risk assessments for 1,2,4-triazole and triazole conjugates which was completed on Feb 7, 2006 (D320683). The Tier II drinking water assessment for 1,2,4-triazole was completed in Feb 28, 2006 (D320682). The potential adverse effect of triazole on the ecological environment for the proposed uses was not addressed in this risk assessment.

- Before difenoconazole breaks down to triazole, it forms CGA205375, (1-[2-Chloro-4-(4-chlorophenoxy)-phenyl]-2-[1,2,4]triazol-1-yl-ethanol). CGA205375 has potential to be slightly more mobile in the soil than difenoconazole, based on the registrant-submitted adsorption/desorption study. The potential adverse effect of this degradate on the ecological environment was not addressed in this risk assessment. If this degradate is shown to have potential ecological or human health concern, additional fate and transport studies may be requested at later time.

- No data were available to assess the chronic toxicity of difenoconazole to estuarine/marine fish. The LC_{50}s for estuarine/marine fish were comparable to the LC_{50}s for freshwater fish, suggesting similar acute sensitivity to difenoconazole. In the absence of data, the acute to chronic ratio (ACR) from the freshwater fish data was used to estimate a NOAEC for estuarine/marine fish. The most conservative acute value of 819 µg ai/L was used for estuarine/marine fish. The most sensitive LC50 value for freshwater fish (810 µg ai/L, rainbow trout) and chronic NOAEC value (8.7 µg ai/L, fathead minnow) were used to estimate a fish ACR. An estimated NOAEC value of 8.8 µg ai/L was derived for estuarine/marine fish. Uncertainties with this calculation include species sensitivity and extrapolation error, given that quantified sensitivity factors do not currently exist. The ACR relied on extrapolating from freshwater to estuarine/marine environments and between two freshwater fish species, the rainbow trout and the fathead minnow, which may have different sensitivities to this chemical.

- Chronic estuarine/marine crustacean toxicity was based on a mysid shrimp life cycle toxicity test which resulted in a non-definitive NOAEC < 0.115 µg ai/L for reproductive effects (number offspring/female/reproduction day). There were significant adverse effects on reproductive success at all treatment levels compared to the negative control (42-68%). There is uncertainty associated with the calculated non-definitive RQ values for chronic effects to mysid shrimp which range from >11.22 to > 99.13 for all the proposed uses.

- A qualitative phytotoxicity test (including observations of visible effects on seedling emergence and vegetative vigor) was carried out on terrestrial plant species. No phytotoxic effects were observed in any species at the five treatments tested following pre- or post-emergence application (NOAEC > 0.44 lb a.i./A). At the proposed application rates, adverse affects to non-target terrestrial plants are not expected based on the visually phytotoxicity; however, there are uncertainities associated with these conclusions because definitive RQs cannot be calculated.

- There is uncertainty associated with risk to sediment dwelling organisms. Because difenoconazole is persistent, risk to sediment dwelling organisms should be evaluated, however, a toxicity study was not provided. Estimated pore water concentrations indicated that the concentrations of difenoconazole in the sediment are similar to that in the water column. A sediment toxicity test study determining the toxicity of difenoconazole residues to benthic organisms would reduce this uncertainty.

- For the aquatic assessment, four consecutive difenoconazole applications were modeled. Based on the proposed label language for cucurbits, it is recommended for resistence management that Inspire Super MP be used in the blocking program using the maximum of two consecutive applications before rotating to fungicides with another mode of action registered for those uses. The current version of PRZM-EXAM does not allow modeling alternated applications as recommended by registrant in the proposed label. Therefore, the modeling of cucurbits may be conservative with regard to the application regime.

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APPENDIX A: Status of Fate and Ecological Effects Data Requirements

Table I. Environmental Fate Data Requirements for Difenoconazole			
Guideline Number	**Data Requirement**	**MRID Number**	**Study Classification**
161-1	Hydrolysis (dark; pH 5, 7, and 9)	42245127	Satisfied
161-2	Photodegradation in water (pH 7)	42245128 46950104 46950105	Supplemental Supplemental Supplemental
161-3	Photodegradation on soil	46950106	Supplemental
161-4	Photodegradation in air	46950108 (Waiver request)	Waived
162-1	Aerobic soil metabolism	42245131 42245132 42245133 46950109 46950110 46950111 46950112 46950114	Supplemental Supplemental Supplemental Supplemental Supplemental Supplemental Acceptable Supplemental
162-2	Anaerobic soil metabolism	42245132 42245133	Supplemental Supplemental
162-3	Anaerobic aquatic metabolism	42245134 46950119	Supplemental Supplemental
162-4	Aerobic aquatic metabolism	42245134 46950116 46950117	Supplemental Supplemental Supplemental
163-1	Adsorption/desorption Adsorption/desorption for CGA205375	42245135 42245136 46950121 46950123	Supplemental Supplemental Acceptable Supplemental
163-2	Laboratory volatility	46950125 (Waiver request)	Waived
163-3	Field volatility		Not required
164-1	Terrestrial field dissipation	42245140	Supplemental
164-1	Terrestrial field dissipation	46950126	Acceptable
164-1	Terrestrial field dissipation	46950127	Acceptable
164-1	Terrestrial field dissipation	46950129	Supplemental
n/a	Storage stability study	46950130	Acceptable
164-2	Aquatic field dissipation		Not required
164-3	Forestry dissipation		Not required
165-4	Accumulation in fish	42245142	Satisfied
166-1	Ground water – small prospective		Not required
166-2	Ground water – small retrospective		Not required
201-1	Droplet size spectrum		Reserved
202-1	Drift field evaluation		Reserved

Table A-2: Ecological Effects Data Requirements for Difenoconazole				
Guideline #		Data Requirement	Species / MRID	Study Classification
71-1	850.2100	Avian Oral LD_{50}	Mallard 422451-05	Acceptable
71-2	850.2200	Avian Dietary LC_{50}	Mallard 422451-04	Acceptable
			Bobwhite quail 422451-03	Acceptable
71-4	850.2300	Avian Reproduction	Mallard 422451-06	Accepable (upgraded based on submission of raw data on a per pen basis.)
			Bobwhite quail 469502-02	Acceptable
72-1	850.1075	Freshwater Fish LC_{50}	Bluegill 422451-09	Acceptable
			Rainbow 422451-07	Acceptable
			Rainbow 422451-08	Acceptable
72-2	850.1010	Freshwater Invertebrate Acute LC_{50}	Daphnia 422451-10	Acceptable
72-3(a)	850.1075	Estuarine/Marine Fish LC_{50}	Sheepshead minnow 422451-12	Acceptable
			Sheepshead minnow 429067-02	Acceptable
72-3(b)	850.1025	Estuarine/Marine Mollusk EC_{50}	Eastern oyster shell 422451-13	Acceptable
			Eastern oyster shell 429067-01	Acceptable
72-3(c)	850.1035 850.1045	Estuarine/Marine Shrimp EC_{50}	Mysid 422451-11	Acceptable
72-4(a)	850.1400	Fish Early Life-Stage	Fathead minnow 422451-15	Supplemental (control contamination in two replicates and large relative standard deviation for fish weight in one control replicate)
			Fathead minnow 451375-02	Invalid (only 2 replicates per group [4 are required], raw data not submitted, and high variability in chemical concentrations of lowest test groups)

Table A-2: Ecological Effects Data Requirements for Difenoconazole				
Guideline #		Data Requirement	Species / MRID	Study Classification
72-4(b)	850.1300 850.1350	Aquatic Invertebrate Life-Cycle	Daphnid 422451-14	Acceptable (upgraded)
72-5	850.1500	Freshwater Fish Full Life-Cycle		reserved
122-1(a)	850.4100	Seed Germ./Seedling Emergence (Tier I)		reserved
122-1(b)	850.4150	Vegetative Vigor (Tier I)		reserved
122-2	850.440	Aquatic Plant Growth (Tier I)		reserved
123-1(a)	850.4225	Seed Germ./Seedling Emergence (Tier II)		reserved
123-1(b)	850.4250	Vegetative Vigor (Tier II)		reserved
123-2	850.4400	Aquatic Plant Growth (Tier II)	FW Green Algae (*Pseudokirchneriella subcapitata*) 469205-12	Acceptable
123-2	850.4400	Aquatic Plant Growth (Tier II)	FW Blue-green Algae (*Anabaena flos-aquae*) 469205-06	Acceptable
123-2	850.4400	Aquatic Plant Growth (Tier II)	FW Diatom (*Navicula pelliculosa*) 469205-08	Acceptable
123-2	850.4400	Aquatic Plant Growth (Tier II)	Marine Diatom (*Skeletonema costatum*) 469205-10	Acceptable
123-2	850.4400	Aquatic Plant Growth (Tier II)	Duckweed (*Lemna gibba*) 469205-04	Acceptable
141-1	850.3020	Honey Bee Acute Contact LD_{50}	Honey bee 422451-23	Invalid (six bees escaped from one test group)

Table A-2: Ecological Effects Data Requirements for Difenoconazole				
Guideline #		Data Requirement	Species / MRID	Study Classification
			Honey bee 422451-24	Acceptable
141-2	850.3030	Honey Bee Residue on Foliage		reserved
none	850.3100	Earthworm	Earthworm 422451-25	Supplemental (short test duration)

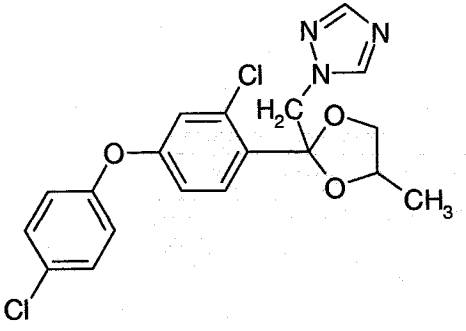
APPENDIX B: Summary of Difenoconazole Degradates

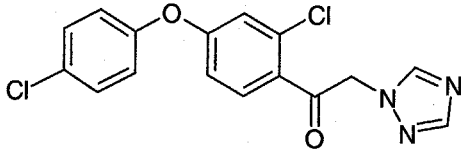
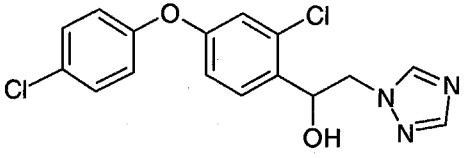
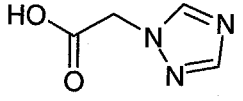
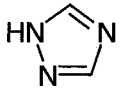
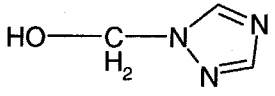
Table B-1. Summary of Difenoconazole Major Degradates and Maximum Percent Formation Observed in the Laboratory and Field Studies.

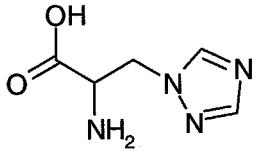
Degradate [1]	*Max Degradate Concentration (% of applied) and Time (days) to Max Concentration*					*Analyzed Degradates*	
	Lab Accumulation in Fish	*Aqueous Photolysis* [2,3,4]	*Aerobic Soil*	*Anaerobic Aquatic*	*Aerobic Aquatic*	*TFD* [5]	*Ground Water*
CGA 205375	51-64%	3.8% (4)	14.8% (360)*	12.6% (175)	11.6% (90)	4.5% (121)[A] 5.3% (364)[B] 3.5% (123)[C] 6.9% (182)[D]	No study
CGA 205374		1.1% (14)	2.1 % (272)	0.8% (247)			
CGA 71019			20.6% (190)	35.9% (350)*			
CGA-142856		41.8% (30)[4]*					
CGA-107069/ CGA-71019		12.27% (30)[4]* 12.9% (9)[4]					

[1] Refer to Table I-2 for name and structure; [2] Difenoconazole was stable under hydrolysis; [3] No meaningful amount of degradates were formed in soil photolysis study (≤ 0.2% and only single replicates); [4] In sterile natural water (MRID 46950105 and MRID 42245128); [5] % of the total applied difenoconazole, based on four applications; [A] under bare soil conditions in GA (MRID 46950126); [B] under potato production condition in ND (MRID 46950129); [C] under a bare plot of loam soil in CA (MRID 46950129); [D] in CA bare loamy sand soil (MRID 42245140); and * The max concentration was observed in the last sampling interval.

Table B-3. Chemical Structures of Difenoconazole and Degradation Products Detected in Submitted Environmental Fate Studies.

Name(s)	Structure	Known Chemical and Fate Parameters	Of Concern?	Rationale
CGA-169374 Difenoconazole 1-[2-[2-Chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-ylmethyl]-1H-1,2,4-triazole. 1-[[2-[2-Chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole. 1-(2-[4-(4-Chlorophenyoxy)-2-chlorophenyl-(4-methyl-1,3-dioxolan-2-yl)-methyl])-1H-1,2,4-triazole. CAS #: 119446-68-3				

Name(s)	Structure	Known Chemical and Fate Parameters	Of Concern?	Rationale
CGA-205374 [CGA-176459] 1-[2-Chloro-4-(4-chlorophenoxy)-phenyl]-2-[1,2,4]triazol-1-yl-ethanone 1-[2-Chloro-4-(4-chlorophenoxy)phenyl]-2-(1H-1,2,4-triazol-1-yl)-ethanone ~~CAS #: 136815-80-0~~				
CGA-205375 [CGA-211391] 1-[2-Chloro-4-(4-chlorophenoxy)-phenyl]-2-[1,2,4]triazol-1-yl-ethanol alpha-[2-Chloro-4-(4-chlorophenoxy)phenyl]-1H-1,2,4-triazole-1-ethanol. CAS #: 117018-19-6		Mobility data available		
CGA-142856 [1,2,4]Triazol-1-yl-acetic acid 1H-1,2,4-Triazole-1-acetic acid. CAS #: 28711-29-7		DW assessment completed in 2006	Yes	
CGA-71019 1-H-(1,2,4)-Triazole 1H-1,2,4-Triazole 4H-[1,2,4]Triazole CAS #: 288-88-0		DW assessment completed in 2006	Yes	potentially more toxic or as toxic as parent
CGA-107069 1-H-(1,2,4)-Triazole-1-methanol CAS #: 74205-82-6				

Name(s)	Structure	Known Chemical and Fate Parameters	Of Concern?	Rationale
CGA-131013 2-Amino-3-[1,2,4]triazol-1-yl-propionic acid alpha-Amino-1H-1,2,4-triazole-1-propanoic acid CAS #: 86362-20-1				

Appendix C: PRZM/EXAMS OUTPUT Files

CA Almond – Aerial
stored as CA_Almonds_A.out
Chemical: Difenoconazole
PRZM environment: CAalmond_WirrigSTD.txt modified Wedday, 13 June 2007 at 11:17:16
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23232.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.4863	0.4081	0.273	0.1759	0.1525	0.08083
1962	1.36	1.178	0.7852	0.552	0.4902	0.2955
1963	0.9148	0.841	0.7025	0.5984	0.5722	0.4974
1964	1.007	0.9267	0.7912	0.6968	0.6733	0.5936
1965	1.082	1.008	0.8694	0.7619	0.7349	0.6607
1966	1.121	1.046	0.9081	0.803	0.7763	0.7055
1967	1.209	1.13	0.9976	0.9013	0.8753	0.7921
1968	1.233	1.153	1.019	0.9167	0.8881	0.8066
1969	1.267	1.194	1.054	0.9488	0.9208	0.8449
1970	1.3	1.227	1.09	0.9823	0.9533	0.8871
1971	1.353	1.272	1.133	1.027	0.9965	0.914
1972	1.352	1.27	1.131	1.028	0.9994	0.922
1973	1.38	1.303	1.166	1.055	1.023	0.9539
1974	1.385	1.308	1.172	1.068	1.048	0.9643
1975	1.398	1.322	1.184	1.071	1.04	0.9594
1976	1.379	1.307	1.168	1.063	1.03	0.9431
1977	1.371	1.298	1.161	1.058	1.028	0.9477
1978	1.44	1.359	1.218	1.106	1.075	1.005
1979	1.45	1.373	1.234	1.123	1.095	1.019
1980	1.456	1.381	1.244	1.14	1.115	1.035
1981	1.458	1.382	1.246	1.137	1.105	1.042
1982	1.53	1.454	1.316	1.206	1.178	1.119
1983	1.563	1.492	1.354	1.245	1.214	1.141
1984	1.57	1.487	1.346	1.234	1.2	1.119
1985	1.521	1.439	1.301	1.191	1.158	1.083
1986	1.536	1.455	1.32	1.209	1.176	1.099
1987	1.5	1.431	1.29	1.18	1.148	1.069
1988	1.471	1.391	1.257	1.153	1.122	1.041
1989	1.451	1.37	1.239	1.141	1.114	1.034
1990	1.486	1.412	1.279	1.172	1.141	1.055

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129	1.57	1.492	1.354	1.245	1.214	1.141	
0.0645161290322581	1.563	1.487	1.346	1.234	1.2	1.119	
0.0967741935483871	1.536	1.455	1.32	1.209	1.178	1.119	
0.129032258064516	1.53	1.454	1.316	1.206	1.176	1.099	
0.161290322580645	1.521	1.439	1.301	1.191	1.158	1.083	
0.193548387096774	1.5	1.431	1.29	1.18	1.148	1.069	
0.225806451612903	1.486	1.412	1.279	1.172	1.141	1.055	
0.258064516129032	1.471	1.391	1.257	1.153	1.122	1.042	
0.290322580645161	1.458	1.382	1.246	1.141	1.115	1.041	
0.32258064516129	1.456	1.381	1.244	1.14	1.114	1.035	
0.354838709677419	1.451	1.373	1.239	1.137	1.105	1.034	
0.387096774193548	1.45	1.37	1.234	1.123	1.095	1.019	
0.419354838709677	1.44	1.359	1.218	1.106	1.075	1.005	
0.451612903225806	1.398	1.322	1.184	1.071	1.048	0.9643	
0.483870967741936	1.385	1.308	1.172	1.068	1.04	0.9594	
0.516129032258065	1.38	1.307	1.168	1.063	1.03	0.9539	
0.548387096774194	1.379	1.303	1.166	1.058	1.028	0.9477	
0.580645161290323	1.371	1.298	1.161	1.055	1.023	0.9431	
0.612903225806452	1.36	1.272	1.133	1.028	0.9994	0.922	
0.645161290322581	1.353	1.27	1.131	1.027	0.9965	0.914	

0.67741935483871	1.352	1.227	1.09	0.9823	0.9533	0.8871
0.709677419354839	1.3	1.194	1.054	0.9488	0.9208	0.8449
0.741935483870968	1.267	1.178	1.019	0.9167	0.8881	0.8066
0.774193548387097	1.233	1.153	0.9976	0.9013	0.8753	0.7921
0.806451612903226	1.209	1.13	0.9081	0.803	0.7763	0.7055
0.838709677419355	1.121	1.046	0.8694	0.7619	0.7349	0.6607
0.870967741935484	1.082	1.008	0.7912	0.6968	0.6733	0.5936
0.903225806451613	1.007	0.9267	0.7852	0.5984	0.5722	0.4974
0.935483870967742	0.9148	0.841	0.7025	0.552	0.4902	0.2955
0.967741935483871	0.4863	0.4081	0.273	0.1759	0.1525	0.08083

0.1	1.5354	1.4549	1.3196	1.2087	1.1778	1.117	
					Average of yearly averages:		0.887654333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CA_Almonds_A
Metfile: w23232.dvf
PRZM scenario: CAalmond_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Difenoconazole

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	406	g/mol	
Henry's Law Const.	henry	8.9e-12	atm-m^3/mol	
Vapor Pressure	vapr	2.5e-10	torr	
Solubility sol	150	mg/L		
Kd Kd		mg/L		
Koc Koc	5381	mg/L		
Photolysis half-life	kdp	228	days	Half-life
Aerobic Aquatic Metabolism	kbacw	556	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1110	days	Halfife
Aerobic Soil Metabolism	asm	313	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.128	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	27-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1 interval	7	days	Set to 0 or delete line for single app.	
app. rate 1 apprate		kg/ha		
Record 17: FILTRA				
IPSCND	1			
UPTKF				
Record 18: PLVKRT				
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA Almond - Ground
stored as CA_Almonds_G.out
Chemical: Difenoconazole
PRZM environment: CAalmond_WirrigSTD.txt modified Wedday, 13 June 2007 at 11:17:16
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23232.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.3126	0.2672	0.1687	0.09485	0.07559	0.03549
1962	1.301	1.11	0.702	0.4597	0.3954	0.202
1963	0.5382	0.4993	0.4206	0.3838	0.3798	0.3623
1964	0.6069	0.5742	0.4757	0.4433	0.4418	0.4192
1965	0.53	0.5183	0.4901	0.4724	0.4682	0.4512

1966	0.5855	0.5675	0.5402	0.508	0.4873	0.4652
1967	0.7193	0.6868	0.6107	0.5558	0.5536	0.5276
1968	0.6019	0.5839	0.5616	0.5505	0.5455	0.52
1969	0.6326	0.6189	0.5771	0.5611	0.5571	0.5381
1970	0.9039	0.8459	0.7188	0.6182	0.5901	0.5654
1971	0.6701	0.6515	0.6243	0.609	0.603	0.5772
1972	0.6708	0.6514	0.6154	0.5977	0.5931	0.5717
1973	0.6734	0.6584	0.6328	0.6142	0.6071	0.5934
1974	0.6673	0.6525	0.6316	0.6274	0.6218	0.5934
1975	0.6704	0.6566	0.6301	0.6098	0.603	0.5793
1976	0.6524	0.6381	0.6115	0.5987	0.5896	0.5581
1977	0.6676	0.6469	0.6046	0.5859	0.5797	0.556
1978	0.7713	0.7489	0.6925	0.6478	0.6326	0.6101
1979	0.7407	0.7195	0.6653	0.6416	0.6385	0.6193
1980	0.7102	0.698	0.6664	0.6543	0.6539	0.6308
1981	0.9219	0.8679	0.7617	0.694	0.6653	0.6326
1982	0.9428	0.8949	0.7837	0.7444	0.7237	0.707
1983	0.8435	0.8263	0.7686	0.7465	0.7401	0.7248
1984	0.8089	0.7883	0.758	0.7391	0.7304	0.7051
1985	0.825	0.7927	0.7302	0.6948	0.6868	0.6671
1986	0.8936	0.858	0.7724	0.7185	0.7044	0.6828
1987	0.7427	0.7284	0.6986	0.6804	0.6732	0.65
1988	0.7038	0.6861	0.6643	0.6537	0.6476	0.6224
1989	0.7193	0.6995	0.6549	0.6428	0.6396	0.6154
1990	0.7734	0.7503	0.6873	0.6723	0.6667	0.6357

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129	1.301	1.11	0.7837	0.7465	0.7401	0.7248	
0.0645161290322581	0.9428	0.8949	0.7724	0.7444	0.7304	0.707	
0.0967741935483871	0.9219	0.8679	0.7686	0.7391	0.7237	0.7051	
0.129032258064516	0.9039	0.858	0.7617	0.7185	0.7044	0.6828	
0.161290322580645	0.8936	0.8459	0.758	0.6948	0.6868	0.6671	
0.193548387096774	0.8435	0.8263	0.7302	0.694	0.6732	0.65	
0.225806451612903	0.825	0.7927	0.7188	0.6804	0.6667	0.6357	
0.258064516129032	0.8089	0.7883	0.702	0.6723	0.6653	0.6326	
0.290322580645161	0.7734	0.7503	0.6986	0.6543	0.6539	0.6308	
0.32258064516129	0.7713	0.7489	0.6925	0.6537	0.6476	0.6224	
0.354838709677419	0.7427	0.7284	0.6873	0.6478	0.6396	0.6193	
0.387096774193548	0.7407	0.7195	0.6664	0.6428	0.6385	0.6154	
0.419354838709677	0.7193	0.6995	0.6653	0.6416	0.6326	0.6101	
0.451612903225806	0.7193	0.698	0.6643	0.6274	0.6218	0.5934	
0.483870967741936	0.7102	0.6868	0.6549	0.6182	0.6071	0.5934	
0.516129032258065	0.7038	0.6861	0.6328	0.6142	0.603	0.5793	
0.548387096774194	0.6734	0.6584	0.6316	0.6098	0.603	0.5772	
0.580645161290323	0.6708	0.6566	0.6301	0.609	0.5931	0.5717	
0.612903225806452	0.6704	0.6525	0.6243	0.5987	0.5901	0.5654	
0.645161290322581	0.6701	0.6515	0.6154	0.5977	0.5896	0.5581	
0.67741935483871	0.6676	0.6514	0.6115	0.5859	0.5797	0.556	
0.709677419354839	0.6673	0.6469	0.6107	0.5611	0.5571	0.5381	
0.741935483870968	0.6524	0.6381	0.6046	0.5558	0.5536	0.5276	
0.774193548387097	0.6326	0.6189	0.5771	0.5505	0.5455	0.52	
0.806451612903226	0.6069	0.5839	0.5616	0.508	0.4873	0.4652	
0.838709677419355	0.6019	0.5742	0.5402	0.4724	0.4682	0.4512	
0.870967741935484	0.5855	0.5675	0.4901	0.4597	0.4418	0.4192	
0.903225806451613	0.5382	0.5183	0.4757	0.4433	0.3954	0.3623	
0.935483870967742	0.53	0.4993	0.4206	0.3838	0.3798	0.202	
0.967741935483871	0.3126	0.2672	0.1687	0.09485	0.07559	0.03549	
0.1	0.9201	0.86691	0.76791	0.73704	0.72177	0.70287	

Average of yearly averages: 0.553956333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:

Output File: CA_Almonds_G
Metfile: w23232.dvf
PRZM scenario: CAalmond_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Difenoconazole

Description	Variable Name		Value	Units	Comments
Molecular weight	mwt	406	g/mol		
Henry's Law Const.	henry	8.9e-12	atm-m^3/mol		
Vapor Pressure	vapr	2.5e-10	torr		
Solubility sol	150	mg/L			
Kd Kd		mg/L			
Koc Koc	5381	mg/L			
Photolysis half-life	kdp	228	days	Half-life	
Aerobic Aquatic Metabolism	kbacw	556	days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	1110	days	Halfife	
Aerobic Soil Metabolism	asm	313	days	Halfife	
Hydrolysis:	pH 7	0	days	Half-life	
Method: CAM	2	integer	See PRZM manual		
Incorporation Depth:	DEPI	0	cm		
Application Rate:	TAPP	0.128	kg/ha		
Application Efficiency:		APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond		
Application Date	Date	27-05	dd/mm or dd/mmm or dd-mm or dd-mmm		
Interval 1 interval	7	days	Set to 0 or delete line for single app.		
app. rate 1 apprate		kg/ha			
Record 17: FILTRA					
IPSCND	1				
UPTKF					
Record 18: PLVKRT					
PLDKRT					
FEXTRC	0.5				
Flag for Index Res. Run		IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)		

FL Cucumber - Aerial
stored as FLcucumberAir.out
Chemical: Difenoconazole
PRZM environment: FLcucumberSTD.txt modified Wedday, 13 June 2007 at 11:19:24
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.7815	0.7168	0.5276	0.4122	0.419	0.2204
1962	2.303	2.016	1.702	1.374	1.363	0.8872
1963	3.567	3.289	2.628	2.107	1.971	1.438
1964	4.074	3.873	3.363	3.106	3.032	2.365
1965	5.352	4.959	4.414	3.922	3.715	3.158
1966	6.874	6.492	5.383	4.838	4.727	4.024
1967	5.952	5.634	5.059	4.642	4.579	4.24
1968	6.541	6.288	5.797	5.38	5.276	4.703
1969	8.116	7.53	6.41	5.781	5.618	5.148
1970	6.561	6.282	5.837	5.494	5.359	5.074
1971	6.383	6.148	5.589	5.125	4.972	4.722
1972	7.238	6.891	6.046	5.529	5.414	4.827
1973	5.79	5.601	5.249	5.093	5.016	4.713
1974	5.507	5.311	4.98	4.855	4.773	4.561
1975	5.663	5.4	4.964	4.679	4.553	4.34
1976	5.408	5.19	4.876	4.615	4.561	4.316
1977	6.742	6.364	5.527	4.914	4.749	4.41
1978	6.99	6.542	5.658	5.203	5.023	4.613
1979	6.98	6.549	5.891	5.339	5.149	4.728
1980	5.652	5.445	5.128	4.949	4.914	4.693
1981	6.08	5.846	5.226	4.989	4.875	4.525
1982	8.062	7.465	6.458	5.574	5.394	4.902

1983	6.009	5.819	5.629	5.285	5.244	4.995
1984	6.309	6.101	5.498	5.304	5.212	4.954
1985	6.363	6.154	5.674	5.34	5.243	4.89
1986	5.986	5.782	5.413	5.223	5.09	4.761
1987	5.89	5.635	5.177	4.933	4.83	4.614
1988	7.065	6.673	5.813	5.495	5.487	4.844
1989	5.297	5.153	4.899	4.731	4.678	4.516
1990	6.061	5.721	5.337	5.015	4.904	4.425

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129		8.116	7.53	6.458	5.781	5.618	5.148
0.0645161290322581		8.062	7.465	6.41	5.574	5.487	5.074
0.0967741935483871		7.238	6.891	6.046	5.529	5.414	4.995
0.129032258064516		7.065	6.673	5.891	5.495	5.394	4.954
0.161290322580645		6.99	6.549	5.837	5.494	5.359	4.902
0.193548387096774		6.98	6.542	5.813	5.38	5.276	4.89
0.225806451612903		6.874	6.492	5.797	5.34	5.244	4.844
0.258064516129032		6.742	6.364	5.674	5.339	5.243	4.827
0.290322580645161		6.561	6.288	5.658	5.304	5.212	4.761
0.32258064516129		6.541	6.282	5.629	5.285	5.149	4.728
0.354838709677419		6.383	6.154	5.589	5.223	5.09	4.722
0.387096774193548		6.363	6.148	5.527	5.203	5.023	4.713
0.419354838709677		6.309	6.101	5.498	5.125	5.016	4.703
0.451612903225806		6.08	5.846	5.413	5.093	4.972	4.693
0.483870967741936		6.061	5.819	5.383	5.015	4.914	4.614
0.516129032258065		6.009	5.782	5.337	4.989	4.904	4.613
0.548387096774194		5.986	5.721	5.249	4.949	4.875	4.561
0.580645161290323		5.952	5.635	5.226	4.933	4.83	4.525
0.612903225806452		5.89	5.634	5.177	4.914	4.773	4.516
0.645161290322581		5.79	5.601	5.128	4.855	4.749	4.425
0.67741935483871		5.663	5.445	5.059	4.838	4.727	4.41
0.709677419354839		5.652	5.4	4.98	4.731	4.678	4.34
0.741935483870968		5.507	5.311	4.964	4.679	4.579	4.316
0.774193548387097		5.408	5.19	4.899	4.642	4.561	4.24
0.806451612903226		5.352	5.153	4.876	4.615	4.553	4.024
0.838709677419355		5.297	4.959	4.414	3.922	3.715	3.158
0.870967741935484		4.074	3.873	3.363	3.106	3.032	2.365
0.903225806451613		3.567	3.289	2.628	2.107	1.971	1.438
0.935483870967742		2.303	2.016	1.702	1.374	1.363	0.8872
0.967741935483871		0.7815	0.7168	0.5276	0.4122	0.419	0.2204
0.1	7.2207	6.8692	6.0305	5.5256	5.412	4.9909	
					Average of yearly averages:		4.15355333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: FLcucumberAir
Metfile: w12844.dvf
PRZM scenario: FLcucumberSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Difenoconazole

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	406	g/mol	
Henry's Law Const.	henry	8.9e-12	atm-m^3/mol	
Vapor Pressure	vapr	2.5e-10	torr	
Solubility sol	150	mg/L		
Kd Kd		mg/L		
Koc Koc	5381	mg/L		
Photolysis half-life	kdp	228	days	Half-life
Aerobic Aquatic Metabolism	kbacw	556	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1110	days	Halfife
Aerobic Soil Metabolism	asm	313	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life

Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:		DEPI	0	cm
Application Rate:		TAPP	0.128	kg/ha
Application Efficiency:			APPEFF	0.95 fraction
Spray Drift		DRFT	0.05	fraction of application rate applied to pond
Application Date		Date	27-05	dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1	interval	7	days	Set to 0 or delete line for single app.
app. rate 1	apprate		kg/ha	
Interval 2	interval	7	days	Set to 0 or delete line for single app.
app. rate 2	apprate		kg/ha	
Interval 3	interval	7	days	Set to 0 or delete line for single app.
app. rate 3	apprate		kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run			IR	EPA Pond
Flag for runoff calc.		RUNOFF	none	none, monthly or total(average of entire run)

FL Cucumber - Ground

stored as FLcucumberGround.out
Chemical: Difenoconazole
PRZM environment: FLcucumberSTD.txt modified Wedday, 13 June 2007 at 11:19:24
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.6882	0.6208	0.4247	0.3066	0.315	0.1365
1962	2.08	1.823	1.507	1.189	1.186	0.7284
1963	3.425	3.136	2.449	1.907	1.767	1.221
1964	3.894	3.685	3.156	2.886	2.813	2.123
1965	5.182	4.773	4.207	3.699	3.483	2.899
1966	6.606	6.216	5.1	4.533	4.438	3.76
1967	5.325	5.065	4.618	4.281	4.219	3.952
1968	6.28	6.016	5.512	5.058	4.956	4.405
1969	7.601	7.048	6.008	5.428	5.278	4.846
1970	5.94	5.717	5.278	5.037	4.941	4.752
1971	5.874	5.666	5.159	4.662	4.57	4.375
1972	6.955	6.597	5.724	5.105	4.994	4.484
1973	5.354	5.147	4.794	4.673	4.627	4.364
1974	5.196	4.992	4.616	4.454	4.376	4.203
1975	5.344	5.072	4.62	4.234	4.128	3.969
1976	4.935	4.751	4.348	4.242	4.189	3.935
1977	6.448	6.055	5.187	4.554	4.388	4.025
1978	6.48	6.05	5.212	4.719	4.56	4.233
1979	6.696	6.247	5.564	4.993	4.801	4.35
1980	5.097	4.924	4.69	4.5	4.457	4.312
1981	5.745	5.501	4.859	4.621	4.508	4.137
1982	7.414	6.863	5.959	5.142	4.975	4.533
1983	5.692	5.466	5.022	4.805	4.786	4.632
1984	6.021	5.804	5.179	4.799	4.746	4.586
1985	6.019	5.802	5.303	4.941	4.863	4.518
1986	5.323	5.167	4.902	4.749	4.646	4.385
1987	5.404	5.162	4.758	4.583	4.478	4.235
1988	6.776	6.368	5.474	5.126	5.054	4.476
1989	4.792	4.666	4.396	4.305	4.277	4.138
1990	5.638	5.299	4.936	4.612	4.523	4.048

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	7.601	7.048	6.008	5.428	5.278	4.846

0.0645161290322581	7.414	6.863	5.959	5.142	5.054	4.752
0.0967741935483871	6.955	6.597	5.724	5.126	4.994	4.632
0.129032258064516	6.776	6.368	5.564	5.105	4.975	4.586
0.161290322580645	6.696	6.247	5.512	5.058	4.956	4.533
0.193548387096774	6.606	6.216	5.474	5.037	4.941	4.518
0.225806451612903	6.48	6.055	5.303	4.993	4.863	4.484
0.258064516129032	6.448	6.05	5.278	4.941	4.801	4.476
0.290322580645161	6.28	6.016	5.212	4.805	4.786	4.405
0.32258064516129	6.021	5.804	5.187	4.799	4.746	4.385
0.354838709677419	6.019	5.802	5.179	4.749	4.646	4.375
0.387096774193548	5.94	5.717	5.159	4.719	4.627	4.364
0.419354838709677	5.874	5.666	5.1	4.673	4.57	4.35
0.451612903225806	5.745	5.501	5.022	4.662	4.56	4.312
0.483870967741936	5.692	5.466	4.936	4.621	4.523	4.235
0.516129032258065	5.638	5.299	4.902	4.612	4.508	4.233
0.548387096774194	5.404	5.167	4.859	4.583	4.478	4.203
0.580645161290323	5.354	5.162	4.794	4.554	4.457	4.138
0.612903225806452	5.344	5.147	4.758	4.533	4.438	4.137
0.645161290322581	5.325	5.072	4.69	4.5	4.388	4.048
0.67741935483871	5.323	5.065	4.62	4.454	4.376	4.025
0.709677419354839	5.196	4.992	4.618	4.305	4.277	3.969
0.741935483870968	5.182	4.924	4.616	4.281	4.219	3.952
0.774193548387097	5.097	4.773	4.396	4.242	4.189	3.935
0.806451612903226	4.935	4.751	4.348	4.234	4.128	3.76
0.838709677419355	4.792	4.666	4.207	3.699	3.483	2.899
0.870967741935484	3.894	3.685	3.156	2.886	2.813	2.123
0.903225806451613	3.425	3.136	2.449	1.907	1.767	1.221
0.935483870967742	2.08	1.823	1.507	1.189	1.186	0.7284
0.967741935483871	0.6882	0.6208	0.4247	0.3066	0.315	0.1365
0.1	6.9371	6.5741	5.708	5.1239	4.9921	4.6274
				Average of yearly averages:		3.82536333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: FLcucumberGround
Metfile: w12844.dvf
PRZM scenario: FLcucumberSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Difenoconazole

Description	Variable Name		Value	Units	Comments
Molecular weight	mwt	406	g/mol		
Henry's Law Const.	henry	8.9e-12	atm-m^3/mol		
Vapor Pressure	vapr	2.5e-10	torr		
Solubility sol	150	mg/L			
Kd Kd		mg/L			
Koc Koc	5381	mg/L			
Photolysis half-life	kdp	228	days	Half-life	
Aerobic Aquatic Metabolism	kbacw	556	days	Halfife	
Anaerobic Aquatic Metabolism	kbacs	1110	days	Halfife	
Aerobic Soil Metabolism	asm	313	days	Halfife	
Hydrolysis:	pH 7	0	days	Half-life	
Method: CAM	2	integer	See PRZM manual		
Incorporation Depth:	DEPI	0	cm		
Application Rate:	TAPP	0.128	kg/ha		
Application Efficiency:		APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond		
Application Date	Date	27-05	dd/mm or dd/mmm or dd-mm or dd-mmm		
Interval 1 interval	7	days	Set to 0 or delete line for single app.		
app. rate 1 apprate		kg/ha			
Interval 2 interval	7	days	Set to 0 or delete line for single app.		
app. rate 2 apprate		kg/ha			
Interval 3 interval	7	days	Set to 0 or delete line for single app.		
app. rate 3 apprate		kg/ha			

Record 17: FILTRA
IPSCND 1
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5

Flag for Index Res. Run		IR	EPA Pond
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)

GA Onion - Aerial

stored as GAOnionAir.out
Chemical: Difenoconazole
PRZM environment: GAOnion_WirrigSTD.txt modified Tueday, 29 May 2007 at 12:54:42
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w03822.dvf modified Wedday, 3 July 2002 at 09:04:32
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.215	1.054	0.7958	0.5683	0.5103	0.2469
1962	1.931	1.761	1.514	1.43	1.41	0.9552
1963	4.834	4.469	3.427	2.724	2.53	1.839
1964	5.74	5.329	4.411	3.723	3.569	2.752
1965	3.789	3.714	3.573	3.497	3.447	3.206
1966	5.824	5.391	4.729	4.263	4.113	3.54
1967	4.431	4.341	4.127	4.036	3.981	3.715
1968	4.518	4.354	4.206	3.971	3.936	3.677
1969	5.937	5.685	4.912	4.476	4.443	3.972
1970	5.962	5.72	5.102	4.767	4.648	4.285
1971	6.976	6.556	5.734	5.193	5.142	4.621
1972	6.364	6.169	5.501	5.21	5.199	4.845
1973	6.715	6.367	5.839	5.365	5.252	4.887
1974	5.194	5.112	4.968	4.865	4.864	4.654
1975	6.084	5.964	5.494	5.097	5.028	4.633
1976	6.258	6.017	5.486	5.345	5.281	4.885
1977	5.645	5.497	5.273	5.06	4.999	4.885
1978	5.118	5.013	4.917	4.792	4.756	4.608
1979	6.739	6.415	5.658	5.313	5.314	4.78
1980	5.715	5.544	5.27	5.042	4.95	4.765
1981	6.733	6.447	5.765	5.224	5.043	4.628
1982	6.706	6.356	5.863	5.544	5.424	4.879
1983	6.514	6.226	5.675	5.457	5.337	4.988
1984	5.558	5.49	5.369	5.157	5.151	4.961
1985	5.828	5.677	5.411	5.069	5.067	4.77
1986	5.715	5.558	5.337	5.099	4.983	4.702
1987	6.659	6.378	5.804	5.361	5.397	4.928
1988	6.223	5.988	5.704	5.349	5.222	4.951
1989	6.259	6.011	5.479	5.298	5.253	4.976
1990	6.548	6.281	5.6	5.171	5.072	4.941

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129	6.976	6.556	5.863	5.544	5.424	4.988	
0.0645161290322581	6.739	6.447	5.839	5.457	5.397	4.976	
0.0967741935483871	6.733	6.415	5.804	5.365	5.337	4.961	
0.129032258064516	6.715	6.378	5.765	5.361	5.314	4.951	
0.161290322580645	6.706	6.367	5.734	5.349	5.281	4.941	
0.193548387096774	6.659	6.356	5.704	5.345	5.253	4.928	
0.225806451612903	6.548	6.281	5.675	5.313	5.252	4.887	
0.258064516129032	6.514	6.226	5.658	5.298	5.222	4.885	
0.290322580645161	6.364	6.169	5.6	5.224	5.199	4.885	
0.32258064516129	6.259	6.017	5.501	5.21	5.151	4.879	
0.354838709677419	6.258	6.011	5.494	5.193	5.142	4.845	
0.387096774193548	6.223	5.988	5.486	5.171	5.072	4.78	
0.419354838709677	6.084	5.964	5.479	5.157	5.067	4.77	

0.451612903225806	5.962	5.72	5.411	5.099	5.043	4.765
0.483870967741936	5.937	5.685	5.369	5.097	5.028	4.702
0.516129032258065	5.828	5.677	5.337	5.069	4.999	4.654
0.548387096774194	5.824	5.558	5.273	5.06	4.983	4.633
0.580645161290323	5.74	5.544	5.27	5.042	4.95	4.628
0.612903225806452	5.715	5.497	5.102	4.865	4.864	4.621
0.645161290322581	5.715	5.49	4.968	4.792	4.756	4.608
0.67741935483871	5.645	5.391	4.917	4.767	4.648	4.285
0.709677419354839	5.558	5.329	4.912	4.476	4.443	3.972
0.741935483870968	5.194	5.112	4.729	4.263	4.113	3.715
0.774193548387097	5.118	5.013	4.411	4.036	3.981	3.677
0.806451612903226	4.834	4.469	4.206	3.971	3.936	3.54
0.838709677419355	4.518	4.354	4.127	3.723	3.569	3.206
0.870967741935484	4.431	4.341	3.573	3.497	3.447	2.752
0.903225806451613	3.789	3.714	3.427	2.724	2.53	1.839
0.935483870967742	1.931	1.761	1.514	1.43	1.41	0.9552
0.967741935483871	1.215	1.054	0.7958	0.5683	0.5103	0.2469
0.1	6.7312	6.4113	5.8001	5.3646	5.3347	4.96

Average of yearly averages: 4.14917

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: GAOnionAir
Metfile: w03822.dvf
PRZM scenario: GAOnion_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Difenoconazole

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	406	g/mol	
Henry's Law Const.	henry	8.9e-12	atm-m^3/mol	
Vapor Pressure	vapr	2.5e-10	torr	
Solubility sol	150	mg/L		
Kd Kd		mg/L		
Koc Koc	5381	mg/L		
Photolysis half-life	kdp	228	days	Half-life
Aerobic Aquatic Metabolism	kbacw	556	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1110	days	Halfife
Aerobic Soil Metabolism	asm	313	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.128	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	27-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1 interval	7	days	Set to 0 or delete line for single app.	
app. rate 1 apprate		kg/ha		
Interval 2 interval	7	days	Set to 0 or delete line for single app.	
app. rate 2 apprate		kg/ha		
Interval 3 interval	7	days	Set to 0 or delete line for single app.	
app. rate 3 apprate		kg/ha		
Record 17:FILTRA				
IPSCND	1			
UPTKF				
Record 18:PLVKRT				
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

GA Onion - Ground
stored as test9.out
Chemical: Difenoconazole

PRZM environment: GAOnion_WirrigSTD.txt modified Tueday, 29 May 2007 at 12:54:42
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w03822.dvf modified Wedday, 3 July 2002 at 09:04:32
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.14	0.972	0.7036	0.4679	0.4083	0.1629
1962	1.733	1.559	1.323	1.234	1.225	0.7914
1963	4.568	4.201	3.147	2.475	2.287	1.62
1964	5.568	5.14	4.189	3.481	3.325	2.494
1965	3.427	3.369	3.183	3.098	3.065	2.902
1966	5.163	4.783	4.237	3.853	3.71	3.194
1967	4.041	3.937	3.74	3.616	3.555	3.33
1968	3.886	3.764	3.562	3.424	3.42	3.251
1969	5.312	5.034	4.268	3.94	3.939	3.526
1970	5.553	5.303	4.663	4.324	4.191	3.826
1971	6.596	6.159	5.307	4.731	4.634	4.158
1972	5.856	5.618	5.024	4.756	4.69	4.378
1973	5.952	5.656	5.142	4.787	4.7	4.409
1974	4.692	4.607	4.465	4.368	4.309	4.159
1975	5.594	5.469	4.986	4.589	4.526	4.127
1976	5.81	5.56	5.01	4.82	4.775	4.379
1977	5.153	5	4.772	4.545	4.462	4.367
1978	4.385	4.314	4.276	4.244	4.224	4.075
1979	6.292	5.954	5.169	4.793	4.794	4.251
1980	4.968	4.831	4.563	4.373	4.343	4.234
1981	6.268	5.971	5.261	4.707	4.525	4.09
1982	5.999	5.676	5.192	4.958	4.857	4.349
1983	5.912	5.631	5.045	4.887	4.78	4.461
1984	5.028	4.956	4.827	4.619	4.573	4.43
1985	5.132	4.955	4.635	4.435	4.454	4.234
1986	5.213	5.051	4.82	4.569	4.456	4.169
1987	6.215	5.923	5.326	4.863	4.865	4.409
1988	5.757	5.513	5.216	4.846	4.719	4.43
1989	5.656	5.417	4.989	4.755	4.721	4.455
1990	6.115	5.837	5.131	4.689	4.571	4.421

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	6.596	6.159	5.326	4.958	4.865	4.461
0.0645161290322581	6.292	5.971	5.307	4.887	4.857	4.455
0.0967741935483871	6.268	5.954	5.261	4.863	4.794	4.43
0.129032258064516	6.215	5.923	5.216	4.846	4.78	4.43
0.161290322580645	6.115	5.837	5.192	4.82	4.775	4.421
0.193548387096774	5.999	5.676	5.169	4.793	4.721	4.409
0.225806451612903	5.952	5.656	5.142	4.787	4.719	4.409
0.258064516129032	5.912	5.631	5.131	4.756	4.7	4.379
0.290322580645161	5.856	5.618	5.045	4.755	4.69	4.378
0.32258064516129	5.81	5.56	5.024	4.731	4.634	4.367
0.354838709677419	5.757	5.513	5.01	4.707	4.573	4.349
0.387096774193548	5.656	5.469	4.989	4.689	4.571	4.251
0.419354838709677	5.594	5.417	4.986	4.619	4.526	4.234
0.451612903225806	5.568	5.303	4.827	4.589	4.525	4.234
0.483870967741936	5.553	5.14	4.82	4.569	4.462	4.169
0.516129032258065	5.312	5.051	4.772	4.545	4.456	4.159
0.548387096774194	5.213	5.034	4.663	4.435	4.454	4.158
0.580645161290323	5.163	5	4.635	4.373	4.343	4.127
0.612903225806452	5.153	4.956	4.563	4.368	4.309	4.09
0.645161290322581	5.132	4.955	4.465	4.324	4.224	4.075
0.67741935483871	5.028	4.831	4.276	4.244	4.191	3.826
0.709677419354839	4.968	4.783	4.268	3.94	3.939	3.526
0.741935483870968	4.692	4.607	4.237	3.853	3.71	3.33
0.774193548387097	4.568	4.314	4.189	3.616	3.555	3.251
0.806451612903226	4.385	4.201	3.74	3.481	3.42	3.194
0.838709677419355	4.041	3.937	3.562	3.424	3.325	2.902

0.870967741935484	3.886	3.764	3.183	3.098	3.065	2.494
0.903225806451613	3.427	3.369	3.147	2.475	2.287	1.62
0.935483870967742	1.733	1.559	1.323	1.234	1.225	0.7914
0.967741935483871	1.14	0.972	0.7036	0.4679	0.4083	0.1629

0.1	6.2627	5.9509	5.2565	4.8613	4.7926	4.43

Average of yearly averages: 3.70274333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: test9
Metfile: w03822.dvf
PRZM scenario: GAOnion_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Difenoconazole

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	406	g/mol	
Henry's Law Const.	henry	8.9e-12	atm-m^3/mol	
Vapor Pressure	vapr	2.5e-10	torr	
Solubility sol	150	mg/L		
Kd Kd		mg/L		
Koc Koc	5381	mg/L		
Photolysis half-life	kdp	228	days	Half-life
Aerobic Aquatic Metabolism	kbacw	556	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1110	days	Halfife
Aerobic Soil Metabolism	asm	313	days	Halfife
Hydrolysis:	pH 7	0	days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.128	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	27-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1 interval	7	days	Set to 0 or delete line for single app.	
app. rate 1 apprate		kg/ha		
Interval 2 interval	7	days	Set to 0 or delete line for single app.	
app. rate 2 apprate		kg/ha		
Interval 3 interval	7	days	Set to 0 or delete line for single app.	
app. rate 3 apprate		kg/ha		
Record 17: FILTRA				
IPSCND	1			
UPTKF				
Record 18: PLVKRT				
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

APPENDIX D: Ecological Hazard Data

Table D-1: Acute Toxicity of Difenoconazole to Fish							
Species	**% A.I.**	**96-hr LC_{50}, mg/L (confidence interval)**	**NOAEC (mg/L)**	**Measured/nominal Flow-through /static**	**Toxicity Classification**	**MRID (study year)**	**Status**
Freshwater Fish							
Bluegill sunfish	96.1	1.2 (0.9, 1.7)[a]	0.52	Mean measured, Static	moderately toxic	422451-09 (1986)	Acceptable
Rainbow trout	96	0.81 (0.63, 1.2)[b]	0.35	Initial measured, Static	highly toxic	422451-07 (1987)	Acceptable
Rainbow trout	96.1	1.06 (0.98, 1.14)	<0.58	mean measured, flow through	moderately toxic	422451-08 (1990)	Acceptable
Estuarine/Marine Fish							
Sheepshead minnow	96.1	0.819 (0, +∞)[c]	0.325	Initial measured, static	highly toxic	422451-12 (1988)	Acceptable
Sheepshead minnow	96	1.1 (0.86, 1.5)[a]	0.27	Mean-measured, Flow through	moderately toxic	429067-02 (1993)	Acceptable

[a] There were no partial mortalities in these studies.
[b] There was only one partial mortality in this study.
[c] Binomial method used for LC_{50}.

Table D-2: Acute Toxicity of Difenoconazole to Invertebrates							
Species	**% A.I.**	**Toxicity endpoint, mg/L (confidence interval)**	**NOAEC (mg/L)**	**Measured/ nominal Flow-through /static**	**Toxicity Classification**	**MRID (year of citation)**	**Status**
Freshwater Invertebrates							
Daphnid	96.1	48hr LC_{50} = 0.77 (0.60, 0.95)	< 0.52	Mean measured, static	highly toxic	422451-10 (1986)	Acceptable
Estuarine/Marine Invertebrates							
Mysid	95	96hr LC_{50} = 0.150 (0.125, 0.194)	0.048	Mean measured, flow through	highly toxic	422451-11 (1990)	Acceptable
Eastern oyster (shell deposition	95	96hr EC_{50} >0.300	0.210	Mean measured, flow through	highly toxic	422451-13 (1990)	Acceptable
Eastern oyster (shell deposition	96	96hr EC_{50} = 0.424 (333, 539)	0.180	Mean measured, flow through	highly toxic	429067-01 (1993)	Acceptable

Table D-3: Chronic (Early-life) Toxicity of Difenoconazole to Freshwater Fish							
Species	**% a.i.**	**NOAEC (µg/L)**	**LOAEC (µg/L)**	**Study Properties**	**Most sensitive parameter**	**MRID (year of citation)**	**Status**
Fathead minnow	94.8	8.7	19	Mean-Measured Concentrations Flow-through	larval length at 30 days post-hatch	422541-15 (1990)	Supplemental (control contamination in two replicates and large relative standard deviation for fish weight in one control replicate)

Table D-4: Chronic (Early-life) Toxicity of Difenoconazole to Freshwater Invertebrates							
Species	**% a.i.**	**NOAEC (µg/L)**	**LOAEC (µg/L)**	**Study Properties**	**Most sensitive parameter**	**MRID (year of citation)**	**Status**
Daphnid	96.1	5.6	13	Mean-Measured Concentrations Flow-through	number of young/adult/ reproduction day and adult length	422541-14 (1988)	Acceptable (Upgraded see MRID 469501-32)

Table D-5: Chronic (Life Cycle) Toxicity of Difenoconazole to Estuarine/Marine Mysid							
Species	**% a.i.**	**NOAEC (µg/L)**	**LOAEC (µg/L)**	**Most sensitive parameters**	**Study Properties**	**MRID (year of citation)**	**Status**
Mysid	94.4	<0.115	0.115	Reproduction- number of young/adult/ reproduction day	Mean-Measured Concentrations Flow-through	469501-33 (2006)	Supplemental (definitive NOAEC not determined for repro, variability in test concentrations)
		0.311	0.786	Growth- male dry weight			

Table D-6. Nontarget Aquatic Plant Toxicity (Tier II) of Difenoconazole					
Species	**%A.I.**	**EC_{50}**	**NOAEC or EC_{05}**	**MRID**	**Classification**
FW Green Algae (*Pseudokirchneriella subcapitata*)	94.4	0.30 mg a.i./L	NOAEC = 0.15 mg a.i./L EC_{05} Not determined	469205-12	Acceptable
FW Blue-green Algae (*Anabaena flos-aquae*)	94.4	Not determined	NOAEC Not determined EC_{05} Not determined	469205-06	Invalid (instability of test substance and variability in test results)
FW Diatom (*Navicula pelliculosa*)	94.4	0.098 mg a.i./L	NOAEC = 0.053 mg a.i./L EC_{05} Not determined	469205-08	Acceptable
Marine Diatom (*Skeletonema costatum*)	94.4	0.43 mg a.i./L	NOAEC = <0.0063 mg a.i./L EC_{05} = 0.087 mg a.i./L	469205-10	Acceptable
Duckweed (*Lemna gibba*)	94.4	1.9 mg a.i./L	NOAEC = <0.11 mg a.i./L EC_{05} = 0.11 mg a.i./L	469205-04	Acceptable

Table D-7: Avian Acute Toxicity to Difenoconazole							
Species	**% A.I.**	**Toxicity Endpoint (95% confidence interval)**	**NOAEC/ NOAEL**	**Toxicity Classification**	**Toxicity symptoms**	**MRID**	**Status**
Acute Single Oral Dose							
Mallard duck	96.1	LD50 >2150 mg/kg-bwt	NOAEL = 2150 mg/kg-bwt	practically non-toxic	no mortality or clinical signs of toxicity	422451-05 (1988)	Acceptable
Acute Dietary							
Mallard duck	96.1	LC50 >5000 mg/kg-diet	NOAEC = 625 mg/kg-diet	practically non-toxic	reduction in body weight gain and food consumption	422451-04 (1988)	Acceptable
Bobwhite quail[a]	95.2	LC50 = 4579 mg/kg-diet (2500,+∞)	NOAEC = 625 mg/kg-diet	slightly toxic	reduction in body weight gain and food consumption	422451-03 (1988)	Acceptable

[a] There was only one partial mortality in this study. Binomial method used for LC_{50}.

Table D-8: Chronic Toxicity of Difenoconazole to Birds						
Species	**% a.i.**	**NOAEC (mg ai/kg-diet)**	**LOAEC (mg ai/kg-diet)**	**Effects**	**MRID (year of citation)**	**Status**
Mallard duck	91.9	125	625	egg shell thinning	422451-06 (1990)	Acceptable (Upgraded based on submission of raw data, see MRID 469205-01)
		21.9	108	Hatchling weight		
Bobwhite quail	94.3	108	539	Reduction in eggs laid, hatchling and 14-day survivor weight, and female weight gain	469502-02 (2000)	Acceptable

Table D-9: Mammalian Acute Oral Toxicity to Difenoconazole					
Species	**% a.i.**	**LD_{50} (mg/kg-bwt)**	**Toxicity Classification**	**MRID (year of citation)**	**Status[a]**
Rat	technical	1453 mg/kg bw	slightly toxic	420900-06 (1987)	Acceptable

[a] Acceptable/non-acceptable classification is from HED reviews.

Table D-10: Mammalian Developmental and Chronic Toxicity to Difenoconazole						
Test Type	**% a.i.**	**NOAEC (mg/kg-diet)**	**LOAEC (mg/kg-diet)**	**Effects**	**MRID (year of citation)**	**Status[a]**
2-generation reproductive (rats)	technical	parental= 25 reproductive = 25	parental = 250 reproductive =250	decreased maternal body weight gain, decreased pup weights at day 21	420900-18 (1988)	Acceptable

[a] Acceptable/non-acceptable classification is from HED reviews.

Table D-11 Acute Toxicity of Difenoconazole to Non-target Insects					
Species	**% a.i.**	**Toxicity endpoint**	**Toxicity classification**	**MRID (year of citation)**	**Status**
Acute Contact					
Honey bee	91.1	LD_{50} > 100 µg/bee	practically non-toxic	422451-24 (1989)	Acceptable

Table D-12: Acute Toxicity of Difenoconazole to Earthworms					
Species	**% a.i.**	**LD_{50} (mg/kg-dw)**	**NOAEC (mg/kg-dw)**	**MRID (year of citation)**	**Status**
Earthworm (*Eisenia foetida*)	96.1 (unlabelled) 97 (labeled)	> 610	610	422451-25 (1987)	Supplemental (duration of the test (14 days) was shorter than recommended (28 days)

Table D-13: Toxicity of Difenoconazole to Terrestrial Plants					
Species	**Purity**	**Endpoints**	**Results**	**MRID (year of citation)**	**Status**
Two monocots (Corn, *Zea mays* and Oat, *Avena fatua*) Four dicots (Turnip, *Brassica rapa*; Cucumber, *Cucumis sativus*; and Soybean, *Glycine max*; and Tomato, *Lycopersicon esculentum*)	250 g/L	Visible phytotoxicity (including emergence and mortality) of seedling emergence and vegetative vigor	No phytotoxic effects were observed in any species at the five treatments tested following pre- or post-emergence application (NOAEC > 0.44 lb a.i./A)	469502-03 (2004)	Supplemental (non GLP, limited number of species tested and growth and other required endpoints)

Appendix E. Locates Run Section 18 Request for Curcurbits grown in Georgia

Species Listing by State with Use Criteria

No species were excluded
Minimum of 1 Acre.
All Medium Types Reported
Mammal, Marine mml, Bird, Amphibian, Reptile, Fish, Crustacean, Bivalve, Gastropod, Arachnid, Insect, Dicot, Monocot, Ferns, Conf/cycds, Coral, Lichen
cucumbers and pickles, cantaloups, watermelons

Georgia (56) species:		**Taxa**	Critical
Habitat			
Salamander, Flatwoods	Threatened	Amphibian	No
(Ambystoma cingulatum)		Freshwater, Vernal pool, Terrestrial	
Plover, Piping	Endangered	Bird	
Yes			
(Charadrius melodus)		Terrestrial	
Stork, Wood	Endangered	Bird	No
(Mycteria americana)		Terrestrial	
Warbler (=Wood), Kirtland's	Endangered	Bird	No
(Dendroica kirtlandii)		Terrestrial	
Woodpecker, Red-cockaded	Endangered	Bird	No
(Picoides borealis)		Terrestrial	
Bankclimber, Purple	Threatened	Bivalve	No
(Elliptoideus sloatianus)		Freshwater	
Combshell, Upland	Endangered	Bivalve	
Yes			
(Epioblasma metastriata)		Freshwater	
Fanshell	Endangered	Bivalve	No
(Cyprogenia stegaria)		Freshwater	
Kidneyshell, Triangular	Endangered	Bivalve	
Yes			
(Ptychobranchus greenii)		Freshwater	
Mucket, Pink (Pearlymussel)	Endangered	Bivalve	No
(Lampsilis abrupta)		Freshwater	
Mussel, Acornshell Southern	Endangered	Bivalve	
Yes			
(Epioblasma othcaloogensis)		Freshwater	
Mussel, Alabama Moccasinshell	Threatened	Bivalve	
Yes			
(Medionidus acutissimus)		Freshwater	
Mussel, Coosa Moccasinshell	Endangered	Bivalve	
Yes			
(Medionidus parvulus)		Freshwater	
Mussel, Fine-lined Pocketbook	Threatened	Bivalve	
Yes			
(Lampsilis altilis)		Freshwater	
Mussel, Gulf Moccasinshell	Endangered	Bivalve	No
(Medionidus penicillatus)		Freshwater	

Mussel, Oval Pigtoe	Endangered	Bivalve	No
(Pleurobema pyriforme)		Freshwater	
Mussel, Ovate Clubshell	Endangered	Bivalve	
Yes			
(Pleurobema perovatum)		Freshwater	
Mussel, Shiny-rayed Pocketbook	Endangered	Bivalve	No
(Lampsilis subangulata)		Freshwater	
Mussel, Southern Clubshell	Endangered	Bivalve	
Yes			
(Pleurobema decisum)		Freshwater	
Mussel, Southern Pigtoe	Endangered	Bivalve	
Yes			
(Pleurobema georgianum)		Freshwater	
Threeridge, Fat (Mussel)	Endangered	Bivalve	No
(Amblema neislerii)		Freshwater	
Torreya, Florida	Endangered	Conf/cycds	No
(Torreya taxifolia)		Terrestrial	
Amphianthus, Little	Threatened	Dicot	No
(Amphianthus pusillus)		Freshwater	
Barbara Buttons, Mohr's	Threatened	Dicot	No
(Marshallia mohrii)		Terrestrial	
Campion, Fringed	Endangered	Dicot	No
(Silene polypetala)		Terrestrial	
Dropwort, Canby's	Endangered	Dicot	No
(Oxypolis canbyi)		Terrestrial, Freshwater	
Pitcher-plant, Green	Endangered	Dicot	No
(Sarracenia oreophila)		Terrestrial, Freshwater	
Pondberry	Endangered	Dicot	No
(Lindera melissifolia)		Terrestrial	
Rattleweed, Hairy	Endangered	Dicot	No
(Baptisia arachnifera)		Terrestrial	
Skullcap, Large-flowered	Threatened	Dicot	No
(Scutellaria montana)		Terrestrial	
Spiraea, Virginia	Threatened	Dicot	No
(Spiraea virginiana)		Terrestrial	
Quillwort, Black-spored	Endangered	Ferns	No
(Isoetes melanospora)		Vernal pool	
Quillwort, Mat-forming	Endangered	Ferns	No
(Isoetes tegetiformans)		Vernal pool	
Chub, Spotfin	Threatened	Fish	
Yes			
(Erimonax monachus)		Freshwater	
Darter, Amber	Endangered	Fish	
Yes			
(Percina antesella)		Freshwater	
Darter, Cherokee	Threatened	Fish	No
(Etheostoma scotti)		Freshwater	
Darter, Etowah	Endangered	Fish	No
(Etheostoma etowahae)		Freshwater	
Darter, Goldline	Threatened	Fish	No
(Percina aurolineata)		Freshwater	
Darter, Snail	Threatened	Fish	No

(Percina tanasi)		Freshwater		
Logperch, Conasauga	Endangered	Fish		
Yes				
(Percina jenkinsi)		Freshwater		
Madtom, Yellowfin	Threatened	Fish		
Yes				
(Noturus flavipinnis)		Freshwater		
Shiner, Blue	Threatened	Fish		No
(Cyprinella caerulea)		Freshwater		
Sturgeon, Gulf	Threatened	Fish		
Yes				
(Acipenser oxyrinchus desotoi)		Saltwater, Freshwater		
Sturgeon, Shortnose	Endangered	Fish		No
(Acipenser brevirostrum)		Saltwater, Freshwater		
Beetle, American Burying	Endangered	Insect		No
(Nicrophorus americanus)		Terrestrial		
Bat, Gray	Endangered	Mammal		No
(Myotis grisescens)		Subterraneous, Terrestrial		
Bat, Indiana	Endangered	Mammal		
Yes				
(Myotis sodalis)		Subterraneous, Terrestrial		
Manatee, West Indian	Endangered	Marine mml		
Yes				
(Trichechus manatus)		Saltwater		
Grass, Tennessee Yellow-eyed	Endangered	Monocot		No
(Xyris tennesseensis)		Terrestrial		
Pink, Swamp	Threatened	Monocot		No
(Helonias bullata)		Terrestrial, Freshwater		
Pogonia, Small Whorled	Threatened	Monocot		No
(Isotria medeoloides)		Terrestrial		
Trillium, Persistent	Endangered	Monocot		No
(Trillium persistens)		Terrestrial		
Trillium, Relict	Endangered	Monocot		No
(Trillium reliquum)		Terrestrial		
Water-plantain, Kral's	Threatened	Monocot		No
(Sagittaria secundifolia)		Freshwater		
Sea turtle, loggerhead	Threatened	Reptile		No
(Caretta caretta)		Saltwater		
Snake, Eastern Indigo	Threatened	Reptile		No
(Drymarchon corais couperi)		Terrestrial		

No species were selected for exclusion.

Dispersed species included in report.

Appendix F. Locates Run Section 18 Request for Almonds in 4 counties in CA

Species in Counties by State and Taxa

No species were excluded

Minimum of 1 Acre

All Medium Types Reported

Mammal, Marine mml, Bird, Amphibian, Reptile, Fish, Crustacean, Bivalve, Gastropod, Arachnid, Insect, Dicot,
Monocot, Ferns, Conf/cycds, Coral, Lichen

almonds

Butte, Glen, Kern, Tehmana Counties, California

Taxa	Species	County	Critical Habitat
Amphibians (2)	California red-legged frog	Butte, Kern	Yes
	California Tiger Salamander	Kern	No
Birds (5)	California Condor	Kern	Yes
	Southwestern Willow Flycatcher	Kern	Yes
	Marbled Murrelet	Glenn	Yes
	Northern Spotted Owl	Glenn, Tehama	Yes
	Least Bell's Vireo	Kern	Yes
Crustacean (2)	Vernal pool fairy shrimp	Butte, Glenn, Tehama	Yes
	Vernal pool tadpole shrimp	Butte, Glenn, Tehama	Yes
Fish (6)	Mohave Tui Chub	Kern	No
	Chinook Salmon (Central valley spring run)	Butte, Glenn Tehama	Yes
	Chinook Salmon (Sacramento river winter run)	Butte, Glenn Tehama	No
	Coho Salmon (Sourthern OR/Northern CA coast)	Glenn	Yes
	Steelhead (California central valley population)	Butte, Glenn, Tehama	Yes
	Steelhead (Northern California population)	Glenn	No
Insects (2)	Valley elderberry longhorn beetle	Butte, Glenn, Tehama	Yes
	Kern primrose sphinx moth	Kern	No
Reptiles (3)	Blunt-nosed leopard lizard	Kern	No
	Giant Garter Snake	Butte, Glen	No
	Desert Tortoise	Kern	Yes

Mammals (4)	San Joaquin Kit Fox	Kern	No
	Giant Kangaroo Rat	Kern	No
	Tipton Kangaroo Rat	Kern	No
	Buena Vista Lake Ornate Shrew	Kern	Yes
Dicot Plants (9)	Bakersfield Cactus	Kern	No
	Hairy Orcutt Grass	Butte, Glen, Tehama	Yes
	Slender Orcutt Grass	Butte, Tehama	Yes
	California Jewelflower	Kern	No
	Kern Mallow	Kern	No
	Butte Co. Meadowfoam	Butte, Tehama	Yes
	Hoover's Spurge	Butte, Glenn, Tehama	Yes
	Green's Tuctoria	Butte, Glen, Tehama	Yes
	San Joaquin Woolly-threads	Kern	No
Monocot Plants (1)	San Joaquin Valley Orcutt Grass	Butte	Yes